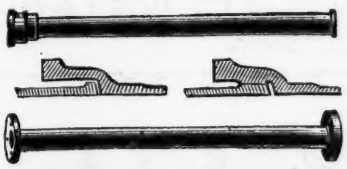
THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXX. No. 1796.] LONDON, OCTOBER 12, 1897. [49TH YEAR. PRICE 6d.

GAS AND WATER PIPES

1¼ to 12 IN. BORE.



THOMAS ALLAN & SONS,

Bonlea Foundry,

SOUTH STOCKTON-ON-TEES.

Formerly Springbank Iron-Works, Glasgow.

ESTABLISHED 1848.

ALSO MANUFACTURERS OF

SANITARY & RAIN-WATER PIPES, HOT WATER PIPES, STABLE FITTINGS, RANGES, STOVES, And GENERAL CASTINGS.

Telegrams: "BONLEA, STOCKTON-ON-TEES."

Lanemark Coal Co.,

LIMITED.

LANEMARK CANNEL AND GAS COALS.

Quotations and Analysis on Application to

LANEMARK COLLIERY,

NEW CUMNOCK, N.B.

Shipping Ports: All the principal Scotch Ports.

— ESTABLISHED 1830. —

PARKER & LESTER,

Manufacturers & Contractors.

THE ONLY MAKERS

PATENT ANTIMONY PAINT,

Parker's Imperial Black Varnish,

Oxide Paints, Oils, and General Stores, for Gas and Water Works.

WORKS:

ORMSIDE STREET, OLD KENT ROAD LONDON.

'BEAR CREEK' CANNEL

LOG MOUNTAIN COAL, COKE, AND TIMBER CO.

PINEVILLE, KENTUCKY, U.S.A.

Cable Address:

"HULL, PINEVILLE." Codes used "ABC" & "A1."

Communications to the Company only.

HOUSE'S FIRE AND JOINTING CEMENTS

Write for List of Users. Before placing your Contracts, ask our Prices.

WE CAN QUOTE LOWER THAN ANY OTHER HOUSE IN THE TRADE FOR QUANTITIES.

HOUSE'S CEMENT COMPANY, Ltd., VAUXHALL ROAD, LIVERPOOL.

No. 50.

INCANDESCENT STREET LAMPS A SPECIALITY.

BIGGS, WALL, & CO.,

GAS AND WATER ENGINEERS,

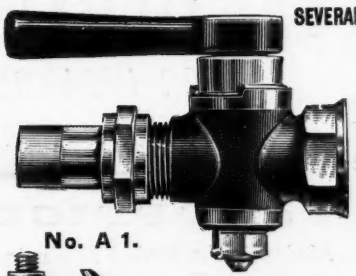
49, FANN STREET,

LONDON, E.C.

WRITE FOR OUR **PRICE LISTS** OF

FULL-WAY MAIN TAPS & LANTERN TAPS.

SEVERAL DESIGNS SHOWN BELOW.



No. A 1.

THESE TAPS ARE

FULL-WAY

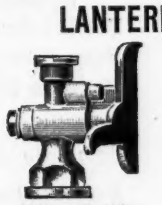
AS SHOWN.

SUPERIOR QUALITY AND FINISH IN GUN METAL.

No. A 1.

LANTERN TAPS.

No. B 10.



No. A 13.

No. A 12.

No. A 11.

SAWER & PURVES, Garratt St. Works, MANCHESTER,

MANUFACTURERS OF

IMPROVED WET GAS-METERS IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

IMPROVED DRY GAS-METERS.

Speciality: PATENT CASH PREPAYMENT METERS.

CATALOGUE SENT ON APPLICATION.

W. J. JENKINS & CO.,

MOUTHPIECES

WITH SELF-SEALING LIDS FOR

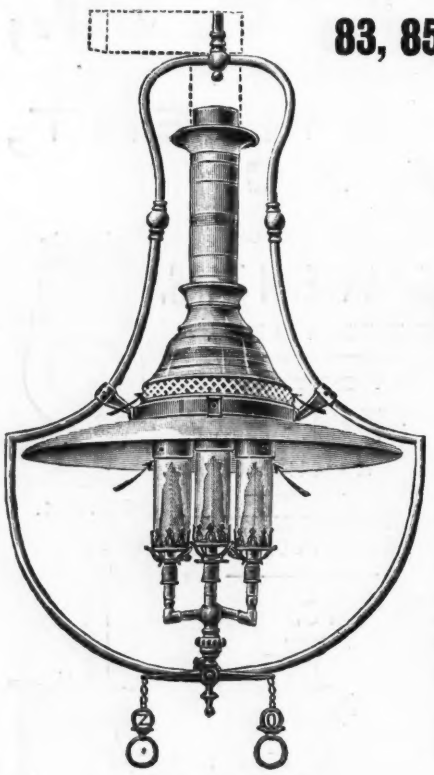
HORIZONTAL AND INCLINED RETORTS.

RETFORD.

FALK, STADELMANN, & CO., LD.

VERITAS LAMP WORKS,

83, 85, & 87, FARRINGDON ROAD, LONDON, E.C.



Pattern No. 42,315.

THE

"VERITAS"

VENTILATING GAS-LAMP,

FOR INCANDESCENT GAS-LIGHT.

(PATENT APPLIED FOR)

For OFFICES, SHOPS, &c.

Abstracts the heated Products of Combustion, and keeps Apartments lighted with it perfectly cool.

For Window Casements, preventing the steaming of Windows.

Very attractive in appearance.

Made for One, Two, or Three Burners, with or without Pilot Light.

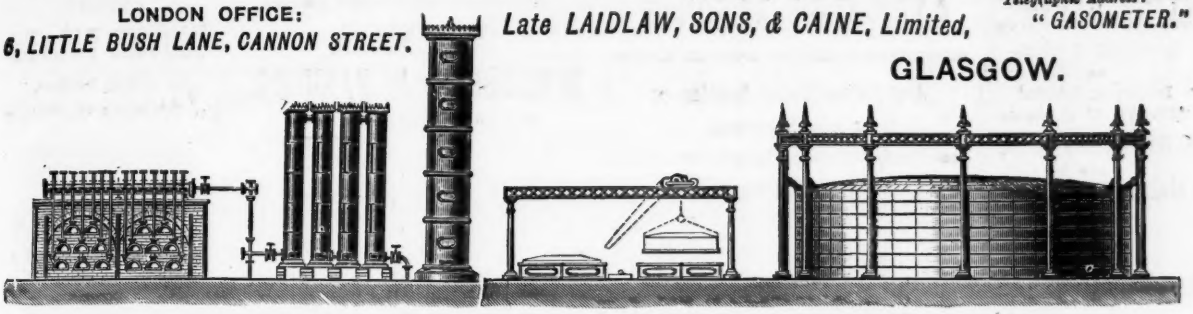
Complete Illustrated Catalogue of above and other Gas Lighting Specialities free (on application) to Gas Companies and the Trade.

THE BARROWFIELD IRON-WORKS, LIMITED,

LONDON OFFICE:
6, LITTLE BUSH LANE, CANNON STREET.

Late LAIDLAW, SONS, & CAINE, Limited,
GLASGOW.

Telegraphic Address:
"GASOMETER."



MANUFACTURERS OF ALL KINDS OF GAS PLANT.

RETORT-BENCH FITTINGS; SIEMENS'S REGENERATIVE AND ORDINARY FURNACES;
CONDENSERS, EXHAUSTERS, AND ENGINES; SCRUBBERS, WASHERS;
PURIFIERS, WITH PLANED AND CEMENT JOINTS;
DRY AND HYDRAULIC CENTRE-VALVES;
HYDRAULIC AND HAND-POWER LIFTING APPARATUS;
GASHOLDERS, SINGLE-LIFT & TELESCOPE; CAST & WROUGHT-IRON TANKS;
STATION METERS; GOVERNORS; SCREW AND RACK VALVES;
FOUR-WAY COCKS AND HYDRAULIC VALVES;
CAST-IRON GAS, WATER, & STEAM PIPES & CONNECTIONS; WROUGHT-IRON TUBES & FITTINGS;
IRON ROOFING, MARKET BUILDINGS, BRIDGES, GIRDERS, STEAM BOILERS;
PROMENADE PIERS AND LOADING WHARVES.

MANUFACTURERS OF OIL PLANT OF EVERY DESCRIPTION.

HENDERSON'S Patent Retorts, Condensers, Stills, Cast and Wrought Iron Tanks, Ammonia Stills, Wrought-Iron Gas-Mains, &c., &c.

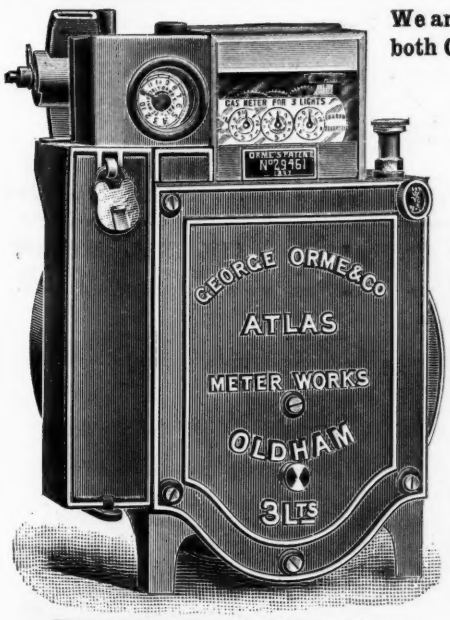
DESCRIPTIVE SPECIFICATIONS AND ESTIMATES ON APPLICATION.

GEORGE ORME & CO.

ATLAS METER WORKS, OLDHAM.

Manufacturers of

ORME'S PATENT IMPROVED COIN METER.



WET COIN METER IN CAST-IRON CASE.

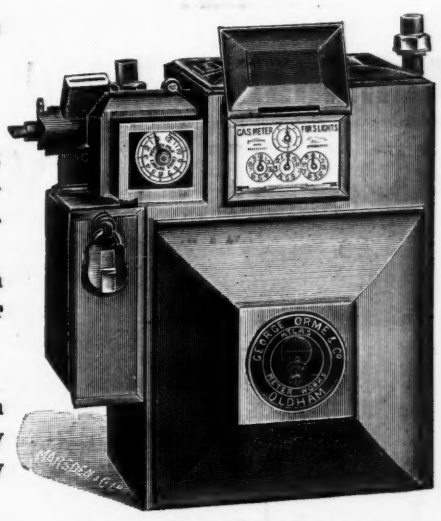
We are now supplying our Wet Coin Meters in Cast-Iron and Tin-Plate Cases, both Ordinary and Compensating; also Dry Coin Meters in Tin-Plate Cases.

A large number of these Meters are in use, and giving satisfaction.

The Mechanism is very simple; and there are no springs or complicated parts to get out of order.

We supply them to work with **1d., 1s., or any other Coin desired.**

The Selling Price of Gas can be changed *in Situ*, and any number of feet delivered, as may be required.



DRY COIN METER IN TIN-PLATE CASE.

Any further Particulars sent upon application.

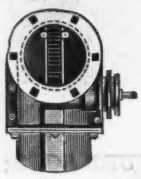
Telegraphic Address: "ORME, OLDHAM." Telephone: No. 93, Oldham.

NEWTON, CHAMBERS, & CO., LIMITED,

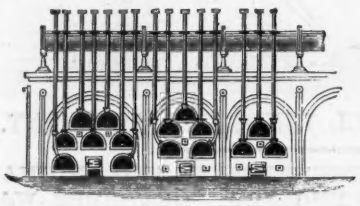
THORNCLIFFE IRON-WORKS, near SHEFFIELD,

MANUFACTURERS OF

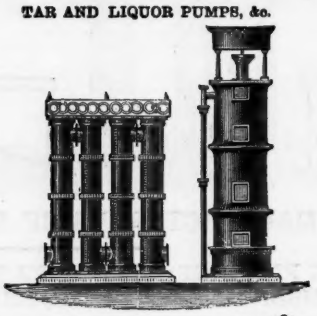
SLIDE VALVES,
WITH RACK & PINION
OR
Internal or External
SCREWS of all sizes.
GASHOLDERS,
AND
Gasholder Tanks.



CAST-IRON RETORTS,
RETORT-BED FITTINGS,
And Retort-House Appliances
of every description,
Iron Roofs, Columns, Girders, Floor Plates,
Tools, &c.

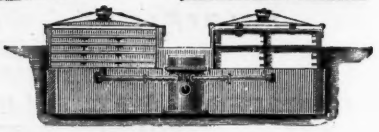


WROUGHT AND CAST IRON
CONDENSERS,
SCRUBBERS, & WASHERS,
TAR AND LIQUOR PUMPS, &c.



PATENT
CENTRE-VALVES
for working Purifiers,
Also Bye-Pass & Stop Valves.

PURIFIERS with Planed Joints,
HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS, and SPECIALS.
WOOD GRIDS.
CAST AND WROUGHT IRON TANKS AND CISTERNS.

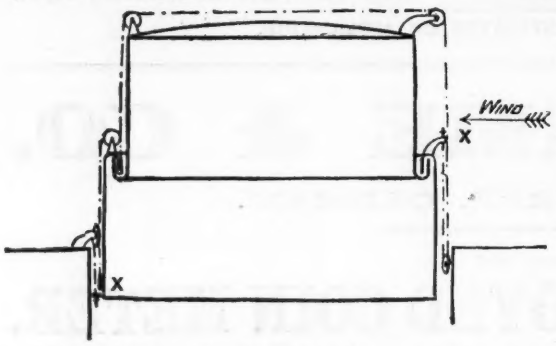


DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

THE CABLE SYSTEM THE SIMPLEST GASHOLDER SUPPORT.



ONE $\frac{3}{4}$-inch Steel Cable in Double Purchase has a controlling power of **60 TONS**

WIND at 30 lbs. per foot has an overturning power of less than **9 TONS**
in the case of a Holder of Two Lifts, 100 ft. by 20 ft.

A Gasholder on the Cable System can rely on a support which is exactly known in amount, is direct and simple in application, and is exerted through the strongest parts of the framework only.

A list will be published next week of some of the 52 Cable Holders erected or on order.

N.B.—If the holder were always at one height, the Cables might be fastened at XX. *The support that the Holder derives from the Cables is equally perfect, notwithstanding its rise and fall.*

ASHMORE, BENSON, PEASE, & CO., LTD., STOCKTON-ON-TEES.

JOSEPH EVANS & SONS, CULWELL WORKS, WOLVERHAMPTON.

Telegrams: "EVANS WOLVERHAMPTON."

PLEASE APPLY FOR CATALOGUE No. 8.

National Telephone No. 7039.

12,000 PUMPS IN STOCK AND PROGRESS.

TRADE MARK.

NO TAPPETS.

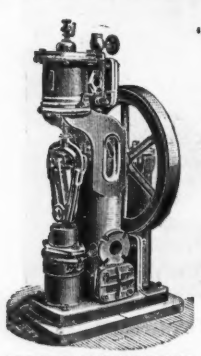


Fig. 703. "SINGLE RAM" STEAM-PUMP.

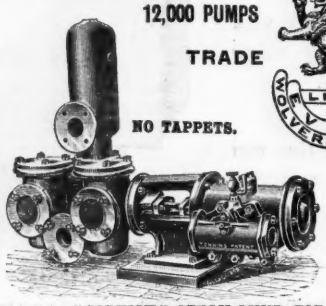


Fig. 898. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

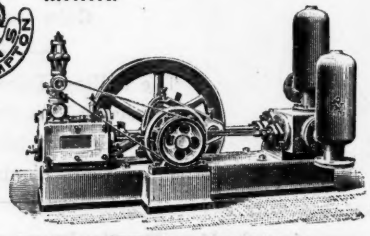


Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

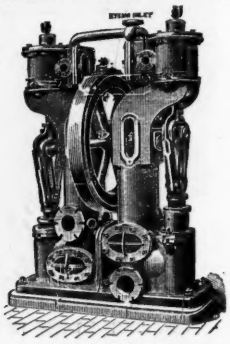


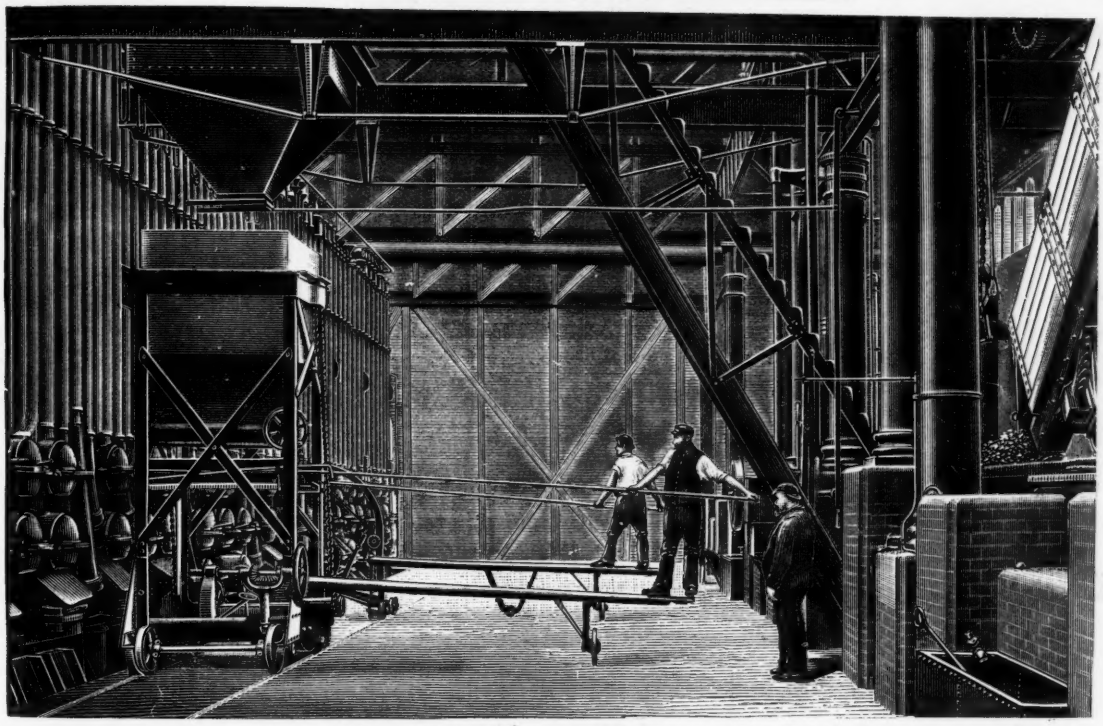
Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

WEST'S GAS IMPROVEMENT CO., LTD.

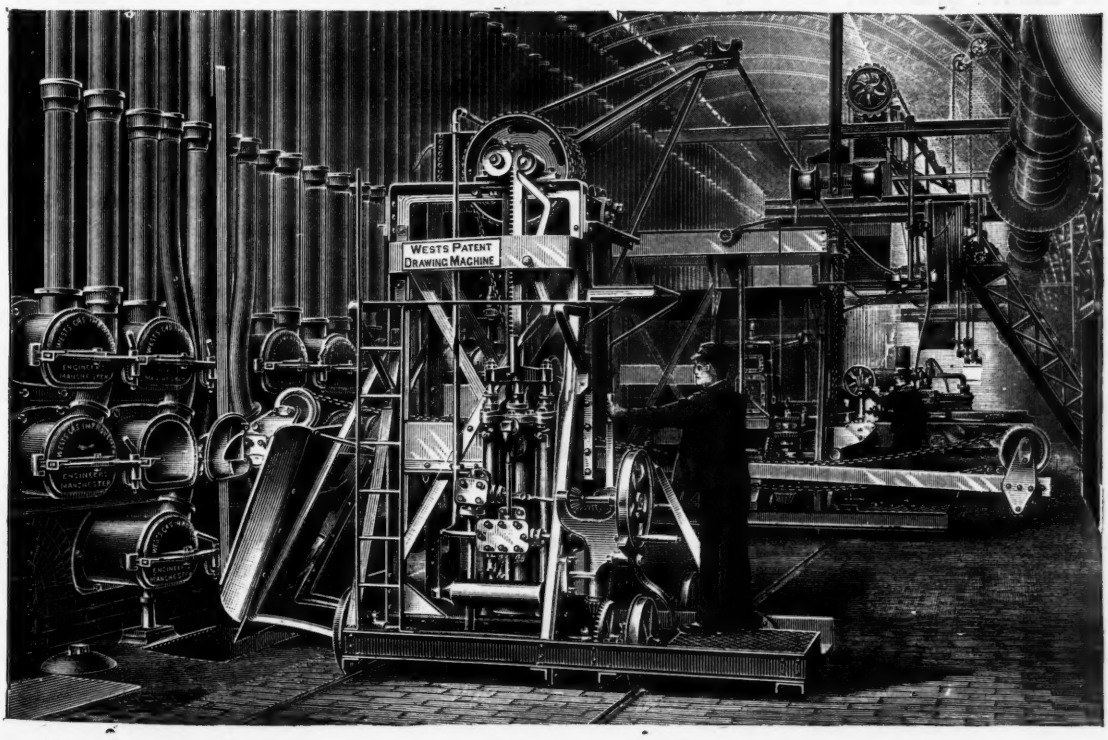
ALBION IRON-WORKS, MILES PLATTING,

MANCHESTER;

And 104, Queen Victoria Street, London, E.C.



West's Manual Charging and Drawing Machines.



West's Compressed-Air Drawing and Charging Machines.

Contractors for

WEST'S REGENERATOR SETTINGS & RETORT-HOUSE PLANT.

IMPROVEMENTS IN STREET LIGHTING.

Highest Efficiency with Greatest Economy.

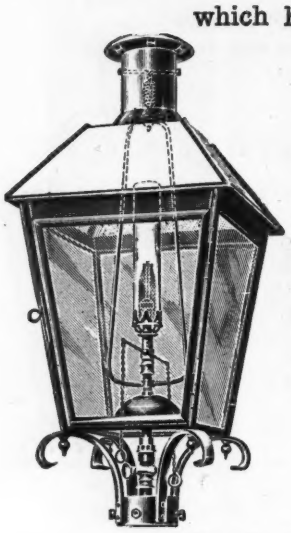
LIGHTING AUTHORITIES, GAS ENGINEERS, and GAS MANAGERS

are invited to inspect the

INCANDESCENT GAS-LIGHT

(Welsbach System),

which has now been successfully adapted to the purposes of

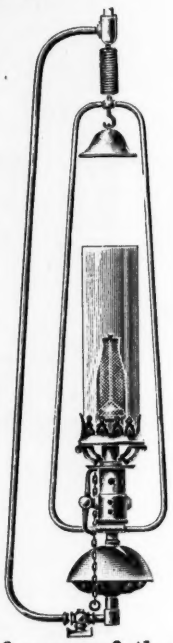


STREET LIGHTING,

the difficulties caused by VIBRATION having been OVERCOME by the use of the

NEW SPRING SUSPENSION FRAME (Patent).

This System of Lighting meets the requirements of all Lighting Authorities in those Districts where it is desired to effect an Improvement in Street Lighting WITHOUT INCREASE OF EXPENDITURE.



The following are Extracts from a PAPER read by Mr. F. G. DEXTER, before the SOUTHERN DISTRICT ASSOCIATION.

"The success of the experimental (Welsbach) lighting secured the contract for one of the Parish Council Districts; and this was shortly followed by the contract for three years for the city lamps. The total represents altogether about 500 single lamps, and 15 refuge lamps containing two lights."

"In the matter of maintenance of the street lights, the record is favourable—in fact, more so than the estimate provided. By the test-meter, the average daily consumption works out to 38 cubic feet per light, including bye-pass. The bye-pass consumes with a flame half an inch long, $\frac{1}{5}$ foot per hour. This represents 1000 cubic feet per lamp per annum. The average consumption per light, when in use, works out to 12,900 feet per annum, or about $3\frac{3}{5}$ feet per light per hour. The lighting is continued all the year round, from the average times of one hour after sunset to one hour before sunrise."

"The mantles have worked out to an average of three per lamp per annum; but, bearing in mind the absence of frost last winter, the writer believes that four mantles per light is more likely to represent average conditions."

"In the matter of cleaning, it may be said that the lanterns require less attention than with the ordinary flat-flame burner."

"The number of lights attended to per man averages 85."

"The 'Welsbach' Light is undoubtedly one of the greatest aids to successful competition that the Gas Industry has ever experienced. Its influence, while reducing the relative cost of light, has advanced the consumption of gas all over the country by the increased satisfaction of the existing consumers, and the attraction of others. The writer feels that its influence should not be confined to the house. It is capable of meeting every competitor in the street, from cheap oils to arc lights, in cost and in effect; and it is hoped that the foregoing experience may lead many others to seek its aid and to realize its efficiency."

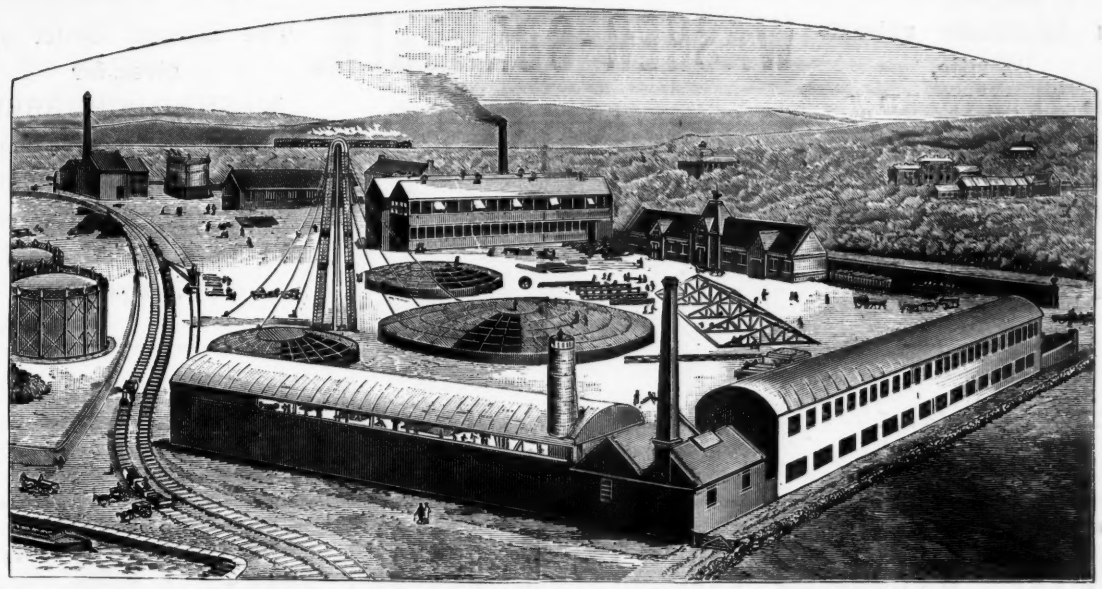
FOR PRICES AND PARTICULARS, APPLY TO THE

INCANDESCENT GAS-LIGHT CO., Ltd.,

Palmer Street, Westminster, London.

WILLEY & CO., GAS ENGINEERS.

OFFICES: EXETER. WORKS: 248, Kingsland Road, LONDON; James St., and St. Thomas, EXETER.



MANUFACTURERS OF WATER-GAS PLANT, GASHOLDERS, GAS-FITTINGS, GAS APPARATUS, WET AND DRY CONSUMERS' METERS, AUTOMATIC METERS—PENNY-IN-THE-SLOT.

CONTRACTORS TO THE GOVERNMENT.

Telephone 132. Telegraphic Address: "WILLEY, EXETER."

LARGEST MANUFACTURERS IN THE UNITED KINGDOM OF GAS-RETORTS,

HORIZONTAL or INCLINED; also Makers of SEGMENTAL RETORTS of all SECTIONS.

PATENTEES OF
MACHINE-FLANGED RETORTS

B. GIBBONS, JUNR., LTD.,

TELEPHONE No. 8010.

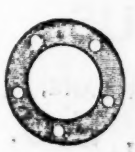
DIBDALE WORKS DUDLEY.

Telegraphic Address: "MACHINE, LOWER GORNAL"

SPECIAL BRICKS and BLOCKS of every description for GENERATOR and REGENERATOR FURNACES.

"ABC" Code and UNICODE used for Telegrams and Cablegrams.

Large Stocks of Bricks of all sizes, Burrs, Boiler Seating Blocks and Covers, Plain and Rebated Tiles, &c., &c.



RETORTS and other FIRE-CLAY GOODS CAREFULLY PACKED for EXPORT.

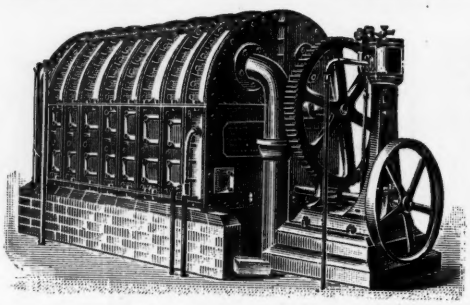
FOREIGN and HOME COPIES of ILLUSTRATED CATALOGUES on Application.

KIRKHAM, HULETT, & CHANDLER, Ld.

3 & 4, PALACE CHAMBERS, BRIDGE STREET, WESTMINSTER, S.W.

PATENT "STANDARD" WASHER-SCRUBBER.

This Apparatus upholds its title, the "STANDARD;" being recognized by leading Engineers as the most efficient Apparatus for the Extraction of Ammonia from Coal or other Gases.



The Largest Order ever given for WASHER-SCRUBBERS was recently received being for **16** Patent "Standard" Washer-Scrubbers, each for 3,500,000 Cubic Feet of Gas per day.

Number of Patent "STANDARD" Washer-Scrubbers in use at this date

540

THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

Midland District Office: PRINCE'S CHAMBERS, 6, CORPORATION STREET, BIRMINGHAM—Sole Agent: A. C. SCRIVENER.
TELEGRAPHIC ADDRESS: "WIGAN BIRMINGHAM." TELEPHONE No. 200.

London District Office: 6, STRAND, LONDON—C. PARKER & SON, Sole Agents.
TELEGRAPHIC ADDRESS: "PARKER LONDON."

R. LAIDLAW & SON,

ENGINEERS & IRONFOUNDERS,

CAST-IRON PIPES

ALL SIZES.

MANUFACTURERS OF

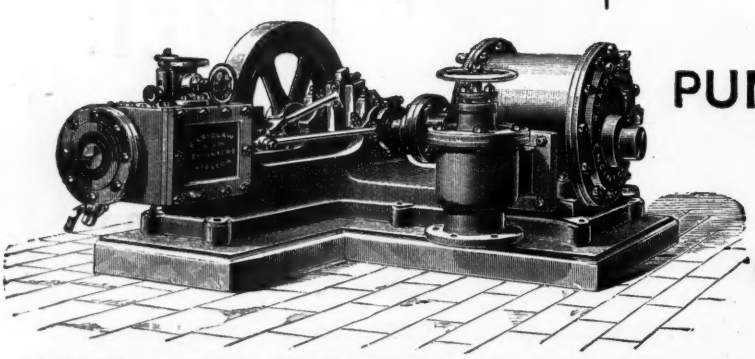
STEAM-ENGINES,

EXHAUSTERS,

VALVES,

AND

PUMPING-ENGINES.



BEALE'S GAS EXHAUSTER AND ENGINE COMBINED. ALL SIZES.

ALL KINDS OF

GAS AND WATER APPARATUS.

ALLIANCE FOUNDRY, GLASGOW. | SIMON SQUARE WORKS, EDINBURGH. | 6, LITTLE BUSH LANE, LONDON, E.C.

ALEX. C. HUMPHREYS, M.Inst.C.E. A. G. GLASGOW, M.E.

SINCE 1893

MESSRS. HUMPHREYS & GLASGOW

Have constructed or have in hand

CARBURETTED WATER-GAS PLANT

FOR THE FOLLOWING UNDERTAKINGS:—

	Cub. Ft. Daily.		Cub. Ft. Daily.
Copenhagen	700,000	Norwich	1,000,000
Belfast	1,700,000	Winchester	200,000
Belfast (Second Contract)	4,500,000	Holyoke, Mass.	600,000
Glasgow	300,000	Hoylake	125,000
Brussels	700,000	Shanghai	225,000
Brussels (Second Contract)	700,000	Stockport	500,000
Liverpool	3,500,000	St. Joseph, Mo.	750,000
Tottenham	750,000	Lea Bridge	350,000
Tottenham (Second Contract)	750,000	Lea Bridge (Second Contract)	350,000
Santiago	400,000	Guildford	350,000
Swansea	750,000	Stockton-on-Tees	500,000
Manchester	3,000,000	Syracuse, N.Y.	850,000
Brighton	1,750,000	Brentford	1,200,000
Preston	1,500,000	Commercial Gas Co.	850,000
New York	1,200,000	Commercial Gas Co. (Second Contract)	850,000
Southport	750,000	Bridlington	125,000
Bath	1,000,000	Middlesbrough	1,250,000
Newburgh, N.Y.	350,000	Croydon	1,250,000
Newburgh, N.Y. (Second Contract)	250,000	L. & N.W. Railway, Crewe	700,000
Edinburgh	2,000,000	Taunton	225,000
Coventry	600,000	Rotterdam	850,000
Coventry (Second Contract)	600,000	Dorking	125,000
Bordentown, N.J.	125,000		

THE GASLIGHT AND COKE CO. { Nine Elms / Bromley } . . . . . 6,250,000 Cubic Feet.

In addition to which the 1891 Installations of The Gaslight and Coke Company, on the Humphreys' Double-Superheater System, have a capacity of 12,000,000 Cubic Feet per diem.

IN THE UNITED STATES,

223 Sets of Humphreys' Double-Superheater Apparatus have been erected by The United Gas Improvement Company alone; 102 of these since 1893. This Company (of which Mr. A. C. Humphreys was formerly Chief Engineer) was, until lately, the largest Constructor of Carburetted Water-Gas Apparatus in the World.

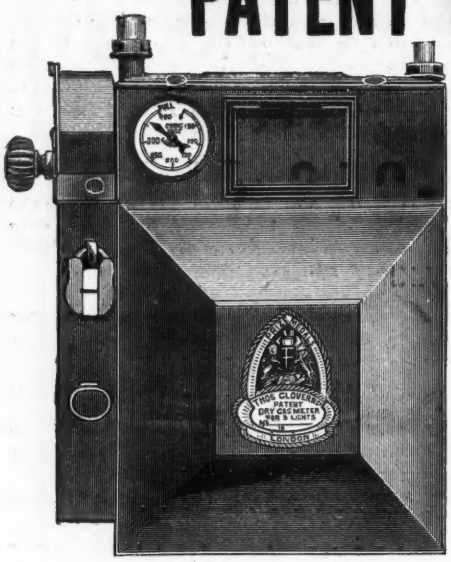
At the present time, Messrs. Humphreys and Glasgow hold that position.

9, VICTORIA STREET, LONDON, S.W.
Telegrams: "EPISTOLARY, LONDON."

UNITED STATES OFFICE:
BANK OF COMMERCE BUILDING, NEW YORK.

THOMAS GLOVER & CO.'S

PATENT NEW IMPROVED PREPAYMENT METER



For Pennies, Shillings, or any Coin.

Simple in Mechanism.
Positive in Results.
Price Changer *in Situ.*

GUARANTEED FOR FIVE YEARS.

Telegraphic Address: "GOTHIC LONDON." Telephone No. 6725.

THOMAS GLOVER & CO., LTD.,

DRY GAS-METER MANUFACTURERS,

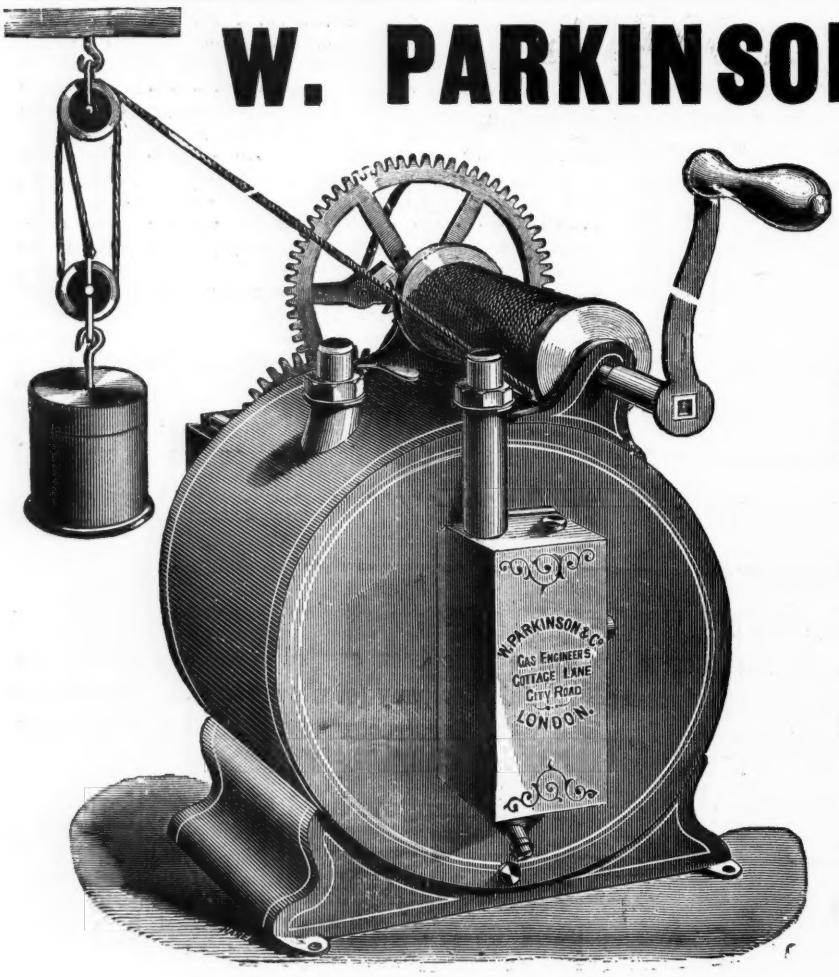
214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

BRISTOL: 28, BATH STREET. *Telegraphic Address: "GOTHIC."*

BIRMINGHAM: 1, OOZELLS STREET. *Telegraphic Address: "GOTHIC."*

MANCHESTER: 37, BLACKFRIARS STREET. *Telegraphic Address: "GOTHIC."*

W. PARKINSON & CO.



PRESSURE RAISERS

For use in Low-Lying Districts, or wherever increased Pressure is required.

For supplying Cooking-Stoves, Gas-Engines, &c.

COTTAGE LANE WORKS, CITY ROAD,

LONDON.

TELEGRAPHIC ADDRESS: "INDEX."

BELL BARN ROAD WORKS,

BIRMINGHAM.

Telegraphic Address: "GAS-METERS."

CONTENTS.

EDITORIAL NOTES:—

GAS, LIGHTING, &c.— PAGE

The Strike in the Engineering Trade 783
The Meeting of the Commercial Gas Company 784
Dr. Lueger and the Capitalists 784
The Address of the President of the Incorporated Law Society . 784
The Case for Technical Education 785

WATER AND SANITARY AFFAIRS—

The Meeting of the East London Water Company 785
The Annual Report of the Local Government Board 785
Alarmist Statement as to the Condition of the London Water Supply 786

ESSAYS, COMMENTARIES, AND REVIEWS:—

Gas and Water Companies in the Stock Market 786
Electric Lighting Memoranda 786
Pacific Coast Gas Association—The Annual Meeting at San Francisco 787
A Case of Gas Poisoning Twenty-Three Years Ago 788
Water Acts for 1897 789

COMMUNICATED ARTICLE:—

The Distribution of Gas. By D. Coats Niven, of Calcutta . . . 790

TECHNICAL RECORD:—

Acetylene Gas—Pronouncement of the Home Office. 791
An Incandescent Oil-Lamp 791
Notes on the Enrichment of Coal Gas 792
Inclined Retorts and Stoking Machinery at Vienna 794
The Cost of Street Lighting by Incandescent Burners 794
Inclined Retorts on the Continent 795

REGISTER OF PATENTS:—

Generating and Storing Acetylene—Chesnay, E., and Pillion, L. . 796
Generating and Storing Acetylene—Chesnay, E., and Pillion, L. . 796
Gas-Retort Settings and Regenerator Furnaces for Same—Stevenson, G. E. 796
Coin-Freed Gas-Meters—Gamwell, H. & C., and Lind, J. & J. . . 797
Generating Acetylene—Mackenzie, W. J. 798
Pressure-Gauges—Glover, R. T. & J. G. 798
Gas Heating and Drying Stove—Zschetzschingck, H. 798
Igniter for Gas Motor Engines—Lanchester, F. W. 798
Chimneys for Gas-Lamps—Kray, M. 799
Holder for Acetylene and other Lighting Gases—Jimeno, E. . . 799
Patent Notices 799

CORRESPONDENCE:—

The Scope of the Workmen's Compensation Act, 1897 799

LEGAL INTELLIGENCE:—

Westminster County Court—The Gaslight and Coke Company *v.* Mann; Another Question of Meter Registration 799
Thefts from Prepayment Gas-Meters 799

MISCELLANEOUS:—

Meeting of the Commercial Gas Company 800
Unionism at the Rotherham Corporation Gas-Works—A Strike Threatened 801
Leeds Corporation Gas Supply—The Supervision of the Distribution Department and the Recent Gas Suffocation Cases . . . 801
The Assessment of the Torquay Gas Company 801
Some Projected Companies 802
Electric Lighting Notes 802
The Local Government Board and the Metropolis Water Act, 1897—Notification to Clerks of Vestries and District Boards . . . 803
Meeting of the East London Water-Works Company 803
Rating of Metropolitan Water Companies' Reservoirs 805
The Outbreak of Typhoid Fever at Maidstone 805
The Water-Works Purchase Question at Felixstowe—A Bill to be Promoted 805
Newport Corporation Water Supply—Failure of the Wentwood Scheme; Resignation of the Engineers 805
A Large Water Scheme for East Northumberland 806
Notes from Scotland. 806
Gas and Water Companies' Stock and Share List 807
Current Sales of Gas Products 807
Coal Trade Reports. 808

PARAGRAPHS:—

OBITUARY: Mr. S. Bark; Mr. John Henry Portbury 790
PERSONAL: Mr. C. S. Heard; Mr. W. G. Owens; Mr. J. O. Pask; Alderman Ridley; Mr. R. Leslie S. Badham; Mr. W. Moult; Mr. G. W. Cross; Mr. W. Peed; Dr. F. Clowes 790
Petroleum in Canada 790
"First Principles of Electricity and Magnetism"—"Manual of Electrical Undertakings, 1897"—Lunge's "Tables for Gas Analysis" 791
The Discovery of Thiophene—The "Manjak" of Barbados—The Denayrouze and Bandsept Burners 794
The Breaking Up of Public Roads—The Cost of the St. Anne's-on-the-Sea Gas-Works Purchase Scheme 795
New Works for the Hartlepool Gas and Water Company—The Gas and Water Finances of the Widnes Corporation—Guildford Gas Company 796
Filey Water and Gas-Works Purchase Question 799
Gas Workers and the Engineers' Strike. 801
The "Penny-in-the-Slot" System in Artisans' Dwellings—St. Helens Corporation Gas Committee and the Formation of a Reserve Fund 805
Exeter Water Supply 806
Incandescent Gas *v.* Electric Lighting Oxford—Dorking Gas Company 808
New Purifiers at the Montrose Gas-Works—Nuneaton and the East Warwickshire Water-Works—Cost of Fixing Hired Gas-Stoves at Manchester—Swansea Gas Company—Sales of Shares 809
Reductions in Price—Water Scheme for Westbury—Northam Water Supply—Stokers' Work and Wages—West Gloucestershire Water Company—Increased Storage at the Tonbridge Water-Works 810
The Recent Failure in the Water Supply at Southampton—Contemplated Large Water Scheme for Derbyshire—Typhoid Fever and Water Supply 811

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

EDITORIAL NOTES.

The Strike in the Engineering Trade.

THE fourteenth week of the Engineering Trade Union campaign finds matters, on the surface, very much where they were at the end of the first week. Closer examination of the campaign literature of the past week, however, discloses the fact that, in reality, things are not quite as they appear on the surface. Our last notice of the strike mentioned the offers of intervention reported to have been made by the President of the Board of Trade and others; and the information was "officially" circulated—by the Amalgamated Society of Engineers—that there was every likelihood of a conference being held at an early date. It was plainly the "cue" of the strike leaders to give the general public to understand that they were ready and willing to accept the good offices of the President of the Board of Trade; and their Press supporters took up the cue eagerly, and trumpeted loudly over this proof of magnanimity on the part of the agitators. By Tuesday morning, however, it had become apparent that this party had only been crying "Peace!" when there was no peace, nor any prospect of it. On the contrary, a communication was sent to the newspapers by the Joint Secretaries of the Masters' Federation, showing that "in "the middle of July 180 firms were involved, and now "there are 517. During September, 115 companies and "firms were added to the employers' list. Already October "has seen 25 added to the list."

On Tuesday a meeting of the Executive Committee of the Federated Employers was held at Leeds, which resulted in the unanimous adoption of the following resolutions: "(1) The demand for a reduction of the working "hours to 48 per week has been carefully considered; and "the employers can only repeat that the conditions of the "engineering and allied trades do not admit of any reduc-"tion of hours. (2) An important point involved in the "dispute is the question of the management of works; "and the Federation is determined to secure for its mem-"bers absolute freedom in this respect. (3) Under these "circumstances, any intervention of third parties can "have no useful effect, and cannot, therefore, be enter-"tained." This plain declaration of the masters' position was, of course, received with a "howl of deprecation" from the agitators and their newspapers. A number of other newspapers were struck by it so forcibly as to suggest that they had not previously made a serious attempt to see the matter from the masters' standpoint. There is reason to believe this was actually the case in several instances. Even the best-informed and most open-minded newspaper writers do not necessarily know everything; and until this pronouncement actually hit them on the head, so to speak, some of them had hardly taken the trouble to discriminate between this and any other strike. They thought, and encouraged their readers to think, that when the proper moment arrived, the President of the Board of Trade, or somebody else, would say the word, and masters and men would come to him prepared to talk over their differences, and find a middle way out of them. The publication of the Leeds resolutions put a different complexion upon the whole business; and the awakened newspaper men began to mutter "Penrhyn over again," with better understanding of the reason why the Board of Trade had nothing to say to the settlement in this case.

Somebody then interviewed Mr. Alexander Siemens, who must be pretty well used to the process by this time; and he good-naturedly crossed the t's and dotted the i's of the Leeds resolutions, for the edification of the newspaper-reading world. He reminded the reporter that the employers had not asked for anything. It was the men's Union that had demanded 54 hours' pay for 48 hours' work, which the employers could not afford to concede. This was exactly like any other attempt at a bargain. If a man goes into a shop and wants for 6d. an article which the proprietor will not sell for less than 6½d., there is no more to be said. What right has the would-be purchaser to ask that the difference between himself and the shopkeeper should be referred to arbitration by a third party? The masters did not turn the men out; they turned out themselves to try and force the employers to bend to their desires. All they actually succeeded in accomplishing was to bind the employers together to resist what was recognized as a deliberate attempt to gain the mastery of the workshops. And now that the men are

out, the masters mean to settle all scores with the Trade Union before letting them return. And this policy was adopted, this issue set, as much in the interest of the individual workman as in that of the employers, both of whom stand in danger of being ruined by the "Union "stroke" and its consequences.

As though to further accentuate Mr. Siemens's explanation, news came on the 8th inst. that the associated Shipowners and Ship Repairers of the River Thames had decided to revert to the nine-hour day. In the letter conveying this intimation, the Chairman of the Association said: "Ever since conceding the eight-hour day, which in "itself has proved most unsatisfactory, further encroach-"ments have been made by the societies, although we had "hoped that our concessions had secured finality." The same old story of the futility of concessions made under duress. There is no finality about the demands of a Trade Union that has once tasted the sweets of victory. The officials must show that there is something more to be gained, or their occupation would be gone. This declaration of the Ship Repairers has fallen like a bombshell into the Trade Union camp; and its ultimate consequences are not yet apparent.

The Meeting of the Commercial Gas Company.

THE ordinary general meeting of the Commercial Gas Company was held on Thursday. Mr. J. Blacket Gill, the Chairman of the Company, presided; and there was a small attendance of well-satisfied proprietors. The Chairman did not detain the meeting long with his official address, which was pitched in the minor key natural to the speaker. Mr. Gill dropped the tear of chastened melancholy, figuratively speaking, over the circumstance that the amount requisite to pay the capital charges had not been earned during the half year, which necessitated such a draft upon the undivided balance as to reduce this useful fund to insignificance. He remarked upon the oddity of the fact that so prosperous a Company, with such an expansive business, could not earn their dividend; but he rejoiced decorously in the reflection that the other London Gas Companies are in no better case. He hoped —he could not say for certain, and, not knowing, would not prophesy, but still he thought it likely—that the dividend would be fairly earned next time. Meanwhile there was the question of the increase of capital. Well, the much-canvassed step had been taken; and the proprietors of the Company had had the unique advantage for these times of an offer of new stock at par. Strange to relate, not all had appreciated the privilege. Indeed, proprietors entitled to no less than 10 per cent. of the stock had been so blind to the benefit thus offered to them as to neglect to take their allotment of new stock, which forced the Directors to the alternative of disposing of the amount by auction. At this, the Chairman observed, the Company's Engineer and General Manager, Mr. H. E. Jones, would unaffectedly rejoice; because he would thereby obtain a modicum of premium capital to spend. The whole passage had an air of giving up the case for the old capital regulations, and indicated that, in the interest of the Company, the Directors would have been glad if more proprietors had declined the official offer. The Chairman gave his adhesion to the cause of cheap gas, of nominally low illuminating power; and he offered support to Mr. George Livesey in his efforts to obtain an amelioration of the law and practice of assessment. Neither the Chairman nor the Engineer was able to explain why the consumption of gas in East London should have so suddenly jumped to more than 11 per cent. increase. It is a good sign, both for the Company and for the prosperity of the district; but it is almost too good, inasmuch as there is but a small prospect of its being repeated.

Dr. Lueger and the Capitalists.

THE story of the endeavour of Dr. Lueger, the Burgomaster of Vienna, to procure the wherewithal to carry on his warfare upon the Imperial Continental Gas Association, continues to occupy the financial journals. The tale is told with numerous adornments, descriptive of the kind of men whom Dr. Lueger has associated with himself in the municipal government of the Austrian capital. It is all very interesting in its place, and arouses reflection upon the liability of local authorities in the extreme East and West to fall under the domination of the worst of fanatics. It is by no means easy to find a complete answer to the question how this kind of thing is to be prevented in all circumstances. Dr. Lueger and his satellites and nominees were successful agitators, and the penalty of their success is that they are condemned to carry on the government of Vienna in the place of those whom they have ousted from their positions. While in opposition, they railed against the English Gas Company, and threatened what they would do if they had the power. Now they have it; and a pretty mess they are making in the streets of Vienna. Dr. Lueger has chosen to build new city gas-works rather than let the city acquire at a reasonable price the works of the Imperial Continental Gas Association. But it is one thing to frame big resolutions of this kind, and another to carry them out. He reckoned without the financiers, who are the only real Internationalists of modern times. Capital is the most cosmopolitan of created things. Gold will pour from one end of the world to the other at a touch on the telegraph. Bullion has no nationality, and acknowledges only two controlling influences—security and interest. The greater of these is security. When Dr. Lueger and his party bravely resolved to build new gas-works for Vienna, they entirely forgot that among all the attributes of the pleasant capital on the banks of the Danube, abundance of spare cash does not count. Austria has always been a poor country, from the absence or scarcity of manufactures, mines, and other reproductive agencies. Consequently, all the money she has needed for industrial purposes has had to be imported. The Imperial Continental Gas Association is only one of the organizations by which foreign capital has been placed at the disposal of the Austrian people. It is, in a certain respect, one of a number of enterprises which have become domiciled in the country, and have succeeded, in a measure, in awakening the pleasant-mannered, indolent natives to a sense of the possibilities of modern industrial occupations. The work of a couple of generations, however, has been wantonly upset by Dr. Lueger and his very questionable satellites. Capital has naturally taken the alarm at his principles and methods, and the purse-strings of the only countries that have any money to spare are tightly drawn against him. Poor Austria! It is not so very long ago that an unbridled despotism, which knew no obligations either in honour or in law to subjects or aliens, kept out of the country those fructifying streams of capital that are needed to open the natural resources of the land. Now it is an equally lawless demagogism that acts to the same effect, in a different way. It is indeed an unhappy land; and it is not possible to see how matters are to be improved.

The Address of the President of the Law Society.

THE annual provincial meeting of the Incorporated Law Society of the United Kingdom was held last week in Sheffield, when an interesting Presidential Address was delivered by Mr. W. Godden, and several suggestive papers were read. There is always an attraction, for the lay mind, in the spectacle of lawyers meeting to talk over the mysteries of their profession, just like ordinary mortals. Every man fancies himself a sort of lawyer, and it has been wittily remarked that only to keep out of law argues a pretty good knowledge of it. Still, there is probably no range of subjects respecting which expert and outside opinion differs so widely as in regard to what is commonly called "the law"—meaning judicature, legislation, litigation, and everything else in the legal category, down to "costs." The first topic touched upon by the President in his address was the much-debated question of land registration. Everybody who has bought land has been struck with the curious character of the ordinary method of transfer; and the usual rough-and-ready reformer has clamoured for registration of titles as the obvious panacea for all the trouble. Indeed, it is somewhat difficult to say what has not been advanced as the beneficial result likely to accrue from the simplification of the English law of land transfer in this direction. Mr. Godden effectively disposes of all this ignorant clamour in a few words. He showed that compulsory land registration would involve an enormous officialism, and would be neither less costly nor more satisfactory than even the present system. He earnestly hoped for the passing next session of the Conveyancing Bill introduced by Lord Davey last year. He offered some comments upon the new Order of Procedure which is to come into force on the 25th inst. Under this order, the first step in actions will be to take the directions of the Judge in Chambers as to how the case is to proceed.

A new practice is expected to grow up under this order. Mr. Godden is in favour of the total abolition of the Long Vacation, and its substitution by an eight weeks holiday. Upon the subject of the Workmen's Compensation Act, the President remarked that "it seemed very "desirable that, wherever practicable, a conciliatory "scheme for dealing with workmen's compensation "should supersede the more contentious procedure under "the Act." He then turned to Joint-Stock Companies and limited liability; and passed in review recent reports of departmental and parliamentary inquiries. Mr. Godden does not like the idea of official interference with company business, especially in connection with winding-up proceedings. Like other people, the President of the Incorporated Law Society thinks that our magnificent modern invention of limited liability has its seamy side. It could scarcely be questioned, he said, that a widespread system of speculation and gambling had been encouraged. Then there was the disappearance of the individual trader before the ever-increasing army of boards and committees. "Again, useful industries became over-capitalized. . . . "Still less was he able to admire the union on a gigantic "scale of numerous businesses under one so-called manage-"ment." Two suggestions were offered for the regulation of new limited liability companies. One was a reserved liability of shareholders to creditors, not to be called up except in liquidation, nor for adjustments between shareholders unless so determined beforehand. The idea is that every creditor should have the benefit of the rule of law that sharing profits carries some liability. In this way the fully-paid share as to new companies would disappear. The other condition was that company mortgages of floating moveable property and of future assets, as well as of uncalled capital, should be illegal.

The Case for Technical Education.

The Duke of Devonshire spoke at considerable length on the subject of technical education last Friday, on the occasion of the opening of the new Darlington Technical College. This is an establishment created by the Municipality with the object of aiding instruction in the sciences that underlie the local industries; and naturally the Duke of Devonshire had a good word to say for the idea of popularizing both science and art. With that hard common sense for which his Grace is celebrated among the English statesmen of the day, he did not commit the folly of saying the theoretical knowledge of the principles of science is indispensable to every manual worker; but he did not think it could be denied or doubted that "the higher the average "intelligence of the manual worker the more valuable are "his labours." He went on to say that "there are an in-"creasing number of positions, ranging from that of the "chief manager of a manufacturing establishment which "may employ thousands of hands, to that of the foreman or "superintendent of a subordinate branch of such an estab-"lishment, to whom the knowledge of which he had spoken "is indispensable. It is also undoubted that that supply "of knowledge and intellectual ability cannot be found "unless we give access to the attainment of such know-"ledge to the most of the working classes." Here we have the gist of the whole case for that much-abused institution, the artisans' college. People are beginning to ask whether our national tentatives in the direction of the popularization of science and useful art have not been misdirected. They suspect that this now familiar evening-class system of instruction in what passes for science, frightfully expensive as it is in the mass, only succeeds in creating a rising generation of conceited smatterers, who, like the smart boys of the Board Schools, think themselves above manual work, and are not good enough for anything else. There is something in this view, just as there is undoubted truth in the imputation that mere literary schooling tends to spoil good tradesmen and create poor clerks. At the same time, the only possible remedy for this mischief appears to us to be the provision of more and better education, in the course of which especially the facts of common life are given their proper place and value.

With regard to our industrial population in particular, the need of the age and the country is that a career should be open for all talents. Technical institutes like that of Darlington may be regarded from two aspects—that in which they appear as helping to evoke and employ the higher intelligence of those who attend them, and that in which they are seen to operate in sifting out exceptional capacities from the common run. Unquestionably, it is a good thing to arouse and feed the higher intelligence of young people of all ranks and conditions of life, particularly those without the enormous advantages of favourable heredity and environment. There are many voices that call to passing youth; and among them the advice to seek knowledge and lay a foundation for the wisdom that may come later is easily ignored. There should be in every town a place where young people can get instruction if they will take the pains to seek it. And it should be a point of honour in those who fill the conspicuous places in communities to place a stigma upon wilful ignorance, as they do upon the coarser defaults of personality. But it is equally important that it should be generally understood that for a large majority culture must be its own reward. Now and again, here and there, the popular classes will be found to contain a spirit of uncommon strain. The teachers cannot fail to recognize the phenomenon, rare as it is, of a thirst for knowledge that cannot be satisfied, a perseverance that nothing can daunt. He is assuredly the coming man for whom all means of instruction exist in expectancy. If he arrives but once in a generation, in one out of a hundred schools, he will certainly return a big dividend on the whole.

WATER AND SANITARY AFFAIRS.

In presiding over the half-yearly meeting of the East London Water Company last Thursday, Mr. George Banbury was able to give the shareholders an encouraging as well as a comprehensive address. It was true the Directors had passed through a period in which their parliamentary anxieties exceeded previous experience. But the Company had received a larger revenue and were in the possession of a more abundant supply of water than they had ever known. They were recovering from the effects of frost and drought. Repairs and maintenance cost less than formerly; and the coal account was more moderate. Customers were multiplying, especially outside the Metropolitan boundary, and the means of giving an adequate supply were secured by the new storage works, to which further additions were to be made, as provided by the Company's Act of the past session. Two more reservoirs, and a large main designed to send water at all times to the top of high buildings, were included in the plan of the Bill, which should, of course, have been welcomed by the London County Council, who had frequently made complaint that lofty buildings were left high and dry by the Company. But the Bill met with strenuous opposition, both in the Lords and in the Commons, though it was emphatically approved by Mr. Chaplin; and it ultimately passed, whereas the County Council suffered the absolute rejection of their Purchase Bills. The London Water Companies have now to look forward to whatever may come of the inquiry to be conducted by the Royal Commission under Lord Llandaff. Mr. Banbury does not consider that the East London Company need fear the result; and in all probability he is right. The Company have passed through a formidable ordeal of Committees and Commissions, and are still living and prosperous, though they might have done better had Parliament a few years ago been a little more just. For the purpose of keeping the Companies in order—that is to say, exercising a little control over them—there is the new Metropolis Water Act, making the Companies subject to the jurisdiction of the Railway and Canal Commissioners. But Mr. Banbury would rather have complaints made before a tribunal where the Companies can be heard, than be subject to the one-sided and inaccurate attacks of the newspapers. The Act which makes this provision is avowedly of a temporary character; but what lies beyond it is at present altogether uncertain. We hardly think that the Royal Commission will find reason to recommend the exercise of purchase. The report will show the financial effect of buying up the undertakings; and that will probably be about enough for the ratepayer. While this momentous question awaits settlement, the East London Company may go on, and, by a slight addition to profits, bring up their dividend to its former happy position of 8 per cent., in place of the present 7½ per cent.

The annual report of the Local Government Board, issued

on Saturday, devotes as usual a certain amount of space to the subject of the Metropolitan Water Supply, and gives in an appendix the reports made by General Scott and Sir E. Frankland for 1896. The experience of the past year is said to afford abundant proof of the necessity for an increase of storage capacity in the works of the London Water Companies, in order to meet the maximum demand and to provide against the emergencies of drought. But it is also shown that the Companies are constructing some additional reservoirs; and if it were only possible for the report to be brought up to date, it might be made clear that the Companies are undertaking still further additions. The Chelsea Company are alleged to be remiss; their storage reservoirs being only equal to ten days' supply; whereas General Scott considers they ought to be equal to twenty. Yet at present the Chelsea Company are ahead of four others. The Staines scheme, in which three Companies are concerned, is mentioned as being in accordance with the recommendations of Lord Balfour's Water Commission. At the same time the reports of Sir E. Frankland and General Scott are said to exhibit ample grounds why the Companies should do their utmost to avoid the abstraction of water when the rivers are in flood. When the rivers are not in this condition, but shrinking through drought, a large storage in reserve is approved, so that the flow of the stream shall not be diminished more than is absolutely necessary. The Chelsea Company, while called upon to make enlarged provisions for storage, are included with the Grand Junction and Southwark and Vauxhall Companies as having undertaken works for the construction of new filters, or for the improvement of those already existing. The West Middlesex Company are spoken of as having similar works in contemplation. It cannot be said, therefore, that the Companies are idle; and the demand on the Chelsea is really for a future date. The East London Company, on their part, say that there appears to be a great want of proper means of domestic storage. The use of house cisterns in London is evidently partial; and in the case of the small houses there is a special tendency to dispense with these appliances. In some cases, standpipes supply the need. It is shown that the constant service at the close of last year had been extended to about 86 per cent. of the houses taking water from the Companies' works. General Scott states that in the course of about twelve years the Southwark and Vauxhall Company have transferred, almost entirely at their own instance, some 95 per cent. of their district from the intermittent to the constant system. The East London Company give a constant supply to the whole of their intra-Metropolitan, and to nearly all their extra-Metropolitan area. But the waste of water in the Company's district is very considerable; and there is great difficulty in controlling it. All the Grand Junction district has the constant supply.

Sir E. Frankland's report on the water appeared early in the year, and was discussed in the "JOURNAL" for April 27. To that report we may refer those who are in any degree perturbed by the alarmist statements emanating from the "Medical World," and unadvisedly echoed by a certain portion of the non-medical press. From these statements the public are led to infer that the "filtered" water supply of London contains from 2000 to nearly 5000 micro-organisms per cubic centimetre. The fact is that the water furnished to the consumer rarely has more than forty microbes per cubic centimetre; and the quantity is sometimes down to four. A very extravagant notice of motion is on the *agenda* of the London County Council for to-day, proposing an inquiry by two of the Council's Committees as to whether the causes which have led to the typhoid epidemic in Maidstone "have any parallel in "the conditions of the London Water Supply;" and what steps, if any, should be taken to prevent the propagation of the disease in the Metropolis. If the Council were wise, as soon as this question was mooted they would proceed to the next business. Whatever the motive which prompts the notice of motion, its appearance is only too well calculated to excite unwarranted alarm among the inhabitants of the Metropolis. We have already explained, when dealing with this subject in the last number of the "JOURNAL," how utterly different are the conditions which relate to the water supply of Maidstone compared with that of London. The facts which show this difference are open to everyone who will search for them.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 807.)

THINGS in general did not go very brilliantly in the Stock Exchange last week. Markets opened pretty firm and steady; but the position did not last. There was a marked disposition to realize where profits could be secured; and after that things became very dull, and prices were sensitive to light touches. This was owing partly to the renewed absence of the Hebrew element, and partly to uneasiness arising from gold movements, from traffic and trade, and from the continuation of the strike. So that, with some exceptions in special lines, the course of prices has been downward. A smart draw on our gold put the Money Market on its mettle; but there was nothing sufficient to lead to any speculation on a change of the Bank rate. In the Gas Market, business was, on the whole, a little more active than in the preceding week; but even then it did not come up to anything like fair proportions. Perhaps the chief feature of it was an unusual amount of dealing in the small but choice undertakings whose shares do not come very frequently into the market. The tendency throughout the list remains very favourable; and several more or less considerable advances in price have been effected, while nothing has made a retrograde movement. In Gaslights, the "A" was not very active; but it held on steadily to the old price, and closed without giving any sign of a move either way. Some of the secured issues stood very well; and the "J" 10 per cent. advanced in price. A fair amount of business was done in South Metropolitan, at good steady figures. A few transactions in Commercials showed strength; but the extent of the business was not sufficient to affect quotations. The Suburban and Provincial division was unusually animated; and wherever business was done, excellent prices were commanded—Brentford, Bromley, and Tottenham being especially noticeable. The Continental undertakings were also strong; and Imperial had a nice rise in price. Among the rest, Cape Town advanced further in favour; and Belgrano and San Paulo also rose. The Water Companies were about as quiet as usual. Prices were good pretty well all round, but not quite strong enough to move the quotations up.

The daily operations were: The Gas Market was rather quiet on the opening day; but prices of almost everything that was touched were good, though the only move was a rise of ¼ in San Paulo. Business was a shade more brisk on Tuesday, coupled with good prices. Brentford old advanced 3. Dealings for the most part fell away on Wednesday, though South Metropolitan was more active; but prices were firm. Cape Town shares and debentures rose ½ each. The volume of business done was no greater on Thursday; but prices advanced. Imperial Continental rose 1; Cape Town, ½; and the two Bromley issues were given a big jump of 2 each. Friday, with very moderate business, brought some increased strength. Gaslight "J" and Imperial Continental rose 2 each; and Belgrano debenture, 1½. Saturday was unusually active; but prices underwent no further change.

ELECTRIC LIGHTING MEMORANDA.

Mr. Arthur Wright on the Glasgow Controversy—The General Question—Electricity Supply for Ordinary Purposes—The Popular View.

THE curious squabble over the right to supply electricity in Glasgow, discussed in this column last week, has naturally attracted attention in professional circles; and Mr. Arthur Wright, the Borough Electrical Engineer of Brighton, has published in the "Electrical Review" a communication bearing on the general subject which has been very well received. He begins by observing that the municipal supply of electricity is likely to become a big business in the largest towns; Glasgow being the first to discover that "a little bassinette of a central station, on a site suitable for a small dry goods warehouse," is not sufficient accommodation for the growing infant. The proposal of the Lord Provost to amalgamate the electricity supply and tramways services is then described, with sympathy for the suggestion that the whole of the electrical energy for the requirements of the city should be provided from a common source. As we remarked last week, there is an obviousness about this proposition which carries it a long way towards acceptance at first sight. Men of experience in affairs, however, usually suspect the obvious, and are slow to believe that there is any such "royal road" to the heart of a complicated business as sometimes appears to open of itself. So in this connection, the Lord Provost was careful to disclaim perfection for his scheme; and though it is asserted that personal considerations weighed with the members of the Corporation who procured its rejection, it is impossible that any such incidental motives could have determined the issue in the absence of serious objections.

Mr. Wright correctly regards the question as a very important one; and we are glad to have this opportunity of discussing it in the light of his able criticism and that of other writers in our electrical contemporary. In a sense, the question is a development of that which many Municipalities have had to solve in regard to the administration of their electric lighting

departments—whether these should be worked by the Gas Committee, or independently. The supply of electricity chiefly or wholly for lighting purposes is obviously so nearly akin to the supply of gas, that, so long as the former remains in the infantile stage of being unable to stand alone, there is not merely an obvious, but a real reason for its existing under the guardianship of the gas administration. This consideration applies, as we have often admitted, to gas and electricity supply undertakings in private as well as in public hands, under certain conditions. A public electric lighting service is one of the appurtenances of modern civilization, which every community of sufficient importance may reasonably expect to have at command. Between a central electric lighting station able to pay its own way, however, and one that can be just worked without loss by a gas undertaking, there is a wide margin, in which the good offices of a Gas Company or a Corporation Gas Committee can be exercised for the public benefit. When the electricity supply attains its industrial and commercial majority, there is no longer any excuse for coddling it. There is considerable doubt as to whether a large number of the electric lighting undertakings of the United Kingdom will ever arrive at this stage of independence; but it is quite clear that where any of them can manage to attach to themselves a new and profitable development of the electrical business, such as traction, they will stand a much better chance of success. Besides these, there are the electricity supply undertakings of the great towns, the success of which is assured. In connection with them the suggestion of ulterior motives for the desire to do all the electrical work there is to be done, does not arise. The administrators and managers of these large undertakings must, sooner or later, find themselves in the same dilemma as the Glasgow Corporation.

Mr. Wright suggests that in such cases there should be a General Purposes Electricity Committee, which would be charged with the duty of providing electricity for all the various requirements of the district. The chief function of this Committee would be to see that all their customers get what they want. The Chief Committee would be divided into three Sub-Committees, on Production, Distribution, and Finance respectively. In describing the work of these Committees, Mr. Wright makes some interesting observations. He states that the cost of providing the necessary plant and getting everything ready at the generating station averages between 4d. and 5d. per day per maximum kilowatt demand at the station; and the further works' cost of supplying into the mains the current required is between ½d. and ¾d. per unit, according to the local cost of coal. These are the works' costs; everything else coming under the head of distribution, and varying with the purpose for which the electricity is used. It is rightly emphasized as the most important fact brought out by the accounts of electricity supply stations, "that the cost of the raw materials—namely, coal, water, and sundry stores—which are consumed in the manufacture, so to speak, of electricity, forms generally a small item as compared with the administrative and other fixed charges." The simple reason for this is, of course, that electricity cannot be stored, like gas; consequently, electricity works are in each department proportioned to the maximum demand made upon them by the consumers at the busiest hour of the year. Everything is governed by this maximum demand. This consideration very naturally leads Mr. Wright to a re-statement of his own Brighton system of differential charging—say 6d. or 7d. per unit for the first hour or hour-and-a-half's use of the consumers' maximum demand; thus first of all making sure of recovering from every consumer the bare cost of providing and getting ready the plant and necessaries to supply him, and then letting him have at a very low rate (say 1½d. or 2d. per unit) all the electricity he requires beyond that. By making this a principle rather than putting it as a mere device or statement of opinion, Mr. Wright is led to a definition of the terms upon which a tramway service should be supplied with electricity from a "general purposes" electricity works. He premises that the interests of the tramway services, and any other that may be served from the same supply undertaking, are independent; and he denounces as "not business" the idea that a traction department must necessarily reduce the charges for electricity to consumers for lighting. Indeed, it appears by his treatment of the problem that it cannot possibly matter to the latter whether the central station works a tramway or not. This is doubtless the proper way of basing the financial position; but it is not at all what the public and local authorities think of the question.

In principle, Mr. Wright's suggestion is approved by several other central station managers, and it is a scheme that will have to be reckoned with wherever and whenever electricity comes into general demand for purposes other than lighting. The difficulty is that, in the public estimation, the chief beauty of "combination" undertakings consists in making some member of the combination benefit at the expense of the others. This operation is wrapped up and disguised in all sorts of ways; but for every straightforward central station manager like Mr. Wright, who strives to discover and tell the truth about these matters, there are two or three pushing electricians of the genus "tout," whose interest lies in the opposite direction. The "utilization" of this, the "reduction of the cost" of that, are ever in the air where schemes of municipal electrical "enterprise" are being launched; and the gravest of town councillors is in danger of believing that something can be got out of nothing when that mysterious agency electricity is in question.

THE PACIFIC COAST GAS ASSOCIATION.

In connection with our abstract report of the proceedings at the 1896 meeting of this young but flourishing Association, we briefly indicated some of the special features which tend to attract a greater degree of interest to the meetings held in the Pacific Coast district, than to those of other Gas Associations;* and these characteristics were maintained in a marked degree on the occasion of the fifth annual meeting, held in July last, as will be seen by the account which recently appeared in our columns (*ante*, pp. 479, 530, 583, 682). Another reason why this Association may be selected for special reference, is because its proceedings are an embodiment of the latest ideas that prevail on the other side of the Atlantic as to the mode of conducting such meetings; and it may therefore be examined as a typical American Association, and compared, as such, with the methods of procedure followed in our own country. Now that the fifth meeting has become a matter of history, a few instructive lessons may be gathered from it.

The district association secretary in America, like his *confrère* in England, has been confronted by the difficulty of obtaining sufficient papers to occupy the time of the meeting; and he has tackled it in a manner that is certainly effective so far as filling up the programme is concerned. Taking time by the forelock, a number of members are approached early in the Association year, with a view of inducing them to provide a paper or communication for the next meeting; and it almost appears that he has been successful in establishing a point of etiquette to the effect that there should be no refusal. Some of the papers show signs of painstaking labour, involving the expenditure of a great deal of time. Instances might be quoted in which the authors appear, as a preliminary, to have read up anything and everything referring to their particular subject. In other cases, the fact that the authors have been very much pressed by other engagements is glaringly apparent. And so we find that the agenda includes no less than fourteen papers, covering all topics of special interest at the present time, and presenting a diversity of character that could scarcely be a matter of chance, but indicates the existence of some system which extends beyond the mere selection of the author and the title, and possibly lays down in brief for the guidance of the author the lines upon which the paper is to run. Nor does this list exhaust the contributions of members. There is in addition a report from the Editor of the "Wrinkle Department," comprising twenty-two paragraphs; a kind of omnibus paper called the "Experience Department," which is the work of several members; and the Question-Box, some of the questions propounded being evidently asked in the general as much as the individual interest. The chief advantage of the departments appears to be that they really provide an outlet for the over-modest man, who does not care to see his name in print, or who "could not write a paper to save his life." He has only to send his "widow's mite," or his crude ideas, to the obliging Editor, and they are put before his brethren in appropriate form. Again, there are others who have a curious lot of people to deal with, or are working under critical circumstances, and would rather not put their names over their contributions—sometimes with very good reason, but often from a nervous dread that something in their paper may be seized upon and used to their disadvantage, that has no foundation in fact. We may laugh at this, but there is no denying that many consider it a fearful and terrible thing to appear in priut; and the fact that the usual editorial intimation to the effect that "all communications must be authenticated by the name and address of the author" has become a hard-and-fast rule in all gas managers' associations, sometimes acts as a stopper to the admission of really valuable contributions. The American associations therefore do well to provide, in the persons of the Editors of the "Experience Department" or the "Wrinkle Department," a means of reaching those members who are bashful and retiring, or who have good reasons for concealing their identity. We also notice that, while one or two of the papers might with advantage have been consigned to the more obscure position of a paragraph in the department report, some portions of the reports might with equal advantage have been expanded and sent out in the form of a separate paper, to be considered and discussed as such.

This lengthy programme did not have the effect of smothering the discussions to any extent. A lively interest in each item was shown; and throughout the sittings the discussions were conducted with a life and energy far beyond that usual to the average English meeting, and which also suggests that the discussions are not left to chance, but that the same care and attention which follows the author up to the time when he appears on the platform is directed towards securing a fair debate on his communication. Or possibly the fact that the titles, and in some cases proofs of the papers themselves, are circulated well in advance may direct the attention of the members to their own experiences in connection with the subjects to be treated. But allowing for all this, the alertness of the members of the Pacific Association in comparing notes and discussing experiences, suggests the question of how far parliamentary protection is good for the health of an industry that is not only

* See "JOURNAL," Vol. LXVIII., p. 837.

established but advancing. We do not discount the benefits of limited profits, limited prices, and regulated quality. But having complied with these to a fair average extent, the rest-and-be-thankful spirit comes in—usually starting in the board-room by a disposition to check enterprise in the way of new business and to dwell on the large capital already invested, and extending to the manager and the whole of the staff. This was fully recognized many years ago; and the sliding-scale was introduced as a remedy. To some extent, it has operated in this direction; but the parliamentary enactments from first to last do not afford anything in the way of the healthy stimulus that comes from threatened competition. The uncertainty of tenure in the Pacific Coast district appears to act in a similar way, and to induce a degree of push and enterprise that is wanting, not so much among gas engineers and managers, as by the directorates of the gas undertakings in our own country. The plant, exposed to the winds and storms of unlimited competition, and municipal control of a very free-and-easy kind, acquires a degree of vigour and strength that is not to be met with in the hothouse of parliamentary protection. In England, it is no uncommon thing to find the directorate acting as a drag on the enterprise of the manager. They have every faith in his integrity and ability; but at the same time they believe that, if left to himself, he would run the capital account up to an abnormal amount, and otherwise handicap the best interests of the concern—not wilfully, but by excess of zeal. They can be enterprising when occasion demands, and they are thoroughly roused to a sense of their responsibilities. This was the case in 1882, when a sum of £4000 was raised for the purpose of advertising gas at the Crystal Palace Gas and Electric Exhibition. But since then there has been apathy, and entire absence of anything like a public or patriotic spirit, so far as the general welfare of the gas industry is concerned. Under the circumstances that prevail on the Pacific Coast, the manager has a free hand; and efforts are made in the direction of securing the goodwill of the customers, and increasing the demand for gas, that are still unknown in England. We read of a representative being sent round with a gas-stove to give cookery demonstrations on the side walk, or in the house of any resident who is willing to receive him; of giving away stoves gratis; of a special staff of men, wearing caps bearing the words "Welsbach light," who are employed by the gas company for the purpose of attending to the incandescent gas-lights; of keeping a register of the houses on the district, and making a systematic door-to-door canvass; and of many other ways of considering the wants and even the peculiarities of the consumer, which go far beyond anything yet attempted here.

Some of the papers read at the meeting were of a pedantic character, and as such would be superfluous to an English audience, though quite appropriate to their particular surroundings. But this objection does not apply to the communications on the Welsbach light, the uniformity of gas accounts, gas as fuel, and card book-keeping. These are of general interest wherever gas is made and sold, and are equal, in respect to practical business value and utility, to any papers read before associations of gas managers. With regard to the first-named, there is room at the present juncture, when the use of the incandescent gas-light both for private and public purposes is advancing by leaps and bounds, for English gas managers or lighting inspectors to come forward, on the lines of the report recently published by Mr. Bellamy, of Liverpool, with full details of the methods adopted to overcome the difficulties that arise in practice. That the new system can be made a success, is an established fact. But this result can only be secured by the exercise of some care and skill; and the various details, including some that are at first sight petty and trifling, which are set forth by Mr. Kinney in the paper referred to, may be recommended to the attention of all interested in introducing or developing it. The fact that its numerous good points have enabled it to secure a permanent footing, is by no means proof that the public are already sufficiently educated as to the method of securing the maximum of efficiency or economy that the light is capable of affording. The experiences at Liverpool and elsewhere, show that it is possible to reduce the cost of renewals of mantles and chimneys to a merely nominal sum. The subject of uniformity of gas accounts is also interesting in England just now. Although this was settled by the Gas-Works Clauses Act of 1871, the recent introduction of liquid hydrocarbons, measured and sold by bulk and not by weight, has brought a new and disturbing element into the carbonizing accounts which was not contemplated, and therefore could not be provided for, when the Act was passed. Some improvement on such ambiguous terms as "oil stated in terms of cannel" is urgently called for; and as Mr. Miller takes in, under his system, not only every known method of making illuminating gas, but the electric light as well, a perusal of his paper may possibly suggest some way out of the present confusion. Attention may also be directed to the system of card book-keeping advocated by Mr. Stow, which may be described as the substitution of loose leaves for the ordinary bound ledgers and journal. This system is not unknown to literary and scientific persons, as a convenient means of preserving bulky memoranda, the results of experiments, &c., in a form suited for ready identification and reference; but it is not largely adopted in English counting-houses, nor is it likely to find favour with actuaries and accountants. An eminent chartered accountant is in the habit of remarking, if he finds a quantity of loose memoranda in an office, that there is evidence of a defective system of book-keeping, as under a proper arrangement there should be a place in one of the books for each and every transaction. The existence of a note on a slip of paper shows either that there is no proper place for it, or else that there is some neglect in the matter of prompt entry. The bound volume is a means of preserving each leaf intact; and the entries cannot be destroyed or altered without the fact becoming apparent to the auditor. While it may be possible to devise a means of stamping or numbering the cards used, so as to ensure the production of the whole set at the proper time, or to guard against fraudulent substitution and destroying of originals, the loose leaves would certainly lend themselves more readily to the operations of peculators; and many professional auditors would hesitate before certifying a set of accounts kept on such a system. Further, it would appear that the cards must be stored in pigeon-holes or compartments in boxes, and would therefore occupy a considerably larger space than the orthodox bound volumes; and as they must all be of unform size, there would be considerable waste of space. The system may be useful for many purposes, but rather for unofficial memoranda that need not be audited, or matter of a temporary character, than for the statutory accounts of a company that are to be stored for reference and produced as legal evidence. The fact of the leaves being portable, is useful where measurements are concerned. The details of a service or main can be entered on the spot by the foreman, and the original entry handed in and laid by in its proper place—thus avoiding liability to error in copying or "entering up." The size, number, and index of a meter can be taken in a similar manner.

The Question-Box, "Wrinkle Department," and "Experience Department" are entirely American notions. The first-named is quite an old established friend. The second, though comparatively modern, appears to find general favour, and has led to the introduction of the third, which has been brought in as a means of dealing with information that could scarcely claim to rank as a "wrinkle." The report of the "Wrinkle Department" is creditable both to the Editor (Mr. M. C. Osborn) and to the various correspondents who furnished the information, which in most cases is illustrated. Many of the "wrinkles" show a remarkable degree of ingenuity in the way of arriving at the desired result by simple everyday means. The home-made element is very prominent; ordinary fittings that are likely to be found in any gas-works yard being brought into requisition—showing that in most cases the originator had not only to devise, but actually to construct the arrangement which he described.

We notice that the Pacific Coast Proceedings are to be published in an abridged form for the use of the members. If spare copies are obtainable, they will afford interesting reading for all engaged in the gas industry.

A CASE OF GAS POISONING TWENTY-THREE YEARS AGO.

In connection with the proposal to remove the Edinburgh Gas-Works from their present position near the centre of the city, a somewhat violent polemic has been started by Dr. William Taylor, an Edinburgh physician, who appears to entertain the opinion that gas-works are not only obnoxious, but also actively pestilential, when established in populous neighbourhoods. In the course of some correspondence relating to this subject recently published in the "Scotsman," Dr. Taylor referred to a pamphlet of his own "On Poisoning by the Inhalation of Coal Gas" published in 1874. As this was the first we had heard of such a contribution to medical literature, and we had had recent occasion to deplore the lack of authoritative information on the subject of gas poisoning, we took steps to procure a copy of Dr. Taylor's pamphlet, and succeeded in obtaining the loan of one by the kindness of the author—the work being out of print. We found it to be a reprint of a paper read before the Medico-Chirurgical Society of Edinburgh in April, 1874; the early date being not the least interesting point of the composition. As the supposititious dangers of carburetted water gas have been much discussed of late, it is not a matter of indifference to find that there was trouble of a similar kind in Edinburgh twenty-three years ago, when, of course, nothing but the highest quality of cannel coal gas was distributed through the town. Dr. Taylor's professional interest in the subject originated at half-past ten o'clock on the morning of Saturday, June 7, 1873, when he was called to one of the hotels of the city to attend a gentleman who had been found lying insensible in one of the rooms, and evidently partially asphyxiated by gas that had been escaping all night from an open burner. Dr. Taylor tells his story with that attention to minute detail which is so marked a national characteristic; but it must suffice to repeat that, by persevering with artificial respiration, the patient was relieved of the gas he had inhaled, and bid fair to recover. He gradually sank, however, afterwards, and died without recovering consciousness. Strange to say, there was no *post-mortem* examination, so that the pathological history of the case is imperfect. Curiously enough, the victim had lived in Canada for thirty-five years, during which time he had acquired the Transatlantic weakness for "blowing out the gas"

which has proved so fatal to many Americans; and it is to this piece of ignorance his death was reasonably attributed.

The deplorable accident considerably agitated Dr. Taylor, who looked up the newspapers for records of gas poisoning, and found several which he recounts with full particulars. He became very frightened at the risk run by the inhabitants of towns of being killed outright or having their health undermined by escaped coal gas; and he emitted the devout hope that gas would speedily be superseded by something better to be unfolded by "Chemistry, from her hidden treasures." It must be somewhat of a disappointment to the accomplished gentleman, after so many years, to learn that the principal reason for the removal of the Edinburgh Gas-Works is that the site is not large enough to furnish the increased output demanded by the city consumption. It must be some consolation to him, however, to reflect that neither he nor any other medical practitioner has had many opportunities of repeating in Edinburgh the interesting remedial operations of June, 1873. His clinic, therefore, remains irreproachable.

WATER ACTS FOR 1897.

The following Acts of Parliament, passed last session, relate wholly or in part to water supply:—

The Crowborough District Water Act incorporates a Company with a capital of £30,000, and borrowing powers to the amount of £7500, for the purpose of supplying water to a district in Sussex covering portions of the parishes of Rotherfield, Withyham, and Buxted. The statutory powers are to lapse if not exercised within four years. The authorized works consist of impounding reservoirs and a pumping-station to be constructed on the stream flowing down from Crowborough to Jarvis Brook, with two high-service reservoirs, and the usual subsidiary works. The domestic water-rate is not to exceed 7 per cent., and 9 per cent. for inns and schools. Special rates are sanctioned for meter supplies. A clause is inserted to save the rights of the parish of Rotherfield.

The Devonport Water-Works Act repeals section 14 of the Company's Act of 1893. Certain statutory powers granted in 1889 are revived, and the time allowed for the execution of some specified works is extended to a period of five years from the passing of this Act. The Act is the direct and agreed consequence of the sale of the Stonehouse portion of the undertaking to the Local Authority.

The Eastbourne Water-Works Act authorizes the construction of additional works, comprising a new well to be situated at Filching Glen, in the parishes of Folkington and Jevington, and a number of adits. The Company's pumping-station at Holywell is sanctioned. The necessary land is to be acquired within three years, and the works completed within ten years. Clauses are inserted for the protection of the landowner. Additional capital to the amount of £100,000 is authorized, with the usual borrowing powers.

The Gravesend and Milton Water-Works Act enables the Company to raise £20,000 additional capital, carrying the usual borrowing powers. The previous Act of the Company being dated 1846, it is now enacted that the provisions of the Water-Works Clauses Acts, 1847 (except section 68) and 1863 (except section 12) shall be incorporated with this Act. The requirement as to giving a constant supply is deferred for three years. A special clause provides that the Company are not to be liable for any injury to person or property which may result from the overflowing of any cesspool into which the constant supply may overflow.

The Harrogate Water-Works Act authorizes the raising of £72,000 of additional capital, with the usual borrowing powers. New works are authorized, comprising a reservoir for impounding the waters of the Scargill Beck, and an alteration of the level of the lower embankment of the existing Beaver Dyke reservoir. Clauses are inserted for the protection of the West Riding County Council. Certain farm drainage is to be purified; and compensation water is to be discharged from the Scargill reservoir at the rate of at least 126,000 gallons per day. The landowner is protected. All water supplied by the Company for dietetic purposes must be so filtered as to prevent plumbism, under a penalty of £10 per day for default. The new reservoir is to be completed within seven years, and the other works within ten years.

The Hunstanton Water and Gas Act dissolves the Hunstanton Water Company, Limited, and re-incorporates the proprietors with those of the local Gas Company as a new Water and Gas Company. Of the £30,000 capital of the new Company, £7200 is the original water stock, and £12,800 the additional water stock. The expenses of direction and management are to be divided between the two undertakings proportionately to the amounts of the respective capitals. There are the usual borrowing powers. A new main is to be laid from the pumping-station to the reservoirs. The domestic water-rate is from 9 to 6½ per cent., the higher rate to apply to inns. Meter supplies are specially provided for. Water required for sanitary purposes is to be supplied to all local authorities at the rate of 1s. 6d. per 1000 gallons. The undertaking is to be sold for £13,000 to the District Council of New Hunstanton, who will besides take over the mortgage debt of £1200.

The Luton Water Act authorizes the raising of £40,000 additional capital. The existing share capital is converted into an equivalent amount of 4 per cent. stock. The new capital is to bear the same dividend. There are the usual borrowing powers. Additional lands are required. Certain sections of an Act of 1865 which authorize the Company to cut off the supply of water under specified conditions, are repealed; and instead thereof the Company are empowered to enter the premises and execute necessary repairs.

The Rhymney Valley Gas and Water Act extends, for a period of two years from June 27 last, the time allowed by the Act of 1892 for the construction and completion of the water-works thereby authorized.

The St. Neots Water Act incorporates a Company with a capital of £9000 and the usual borrowing powers for the purpose of supplying water in a district comprising St. Neots and the parishes of Eynesbury, Hardwicke, and St. Neots Rural, in Huntingdonshire. The statutory powers are to be put in force within three years. A clause is inserted defining the conditions of disqualification of directors and shareholders in regard to membership of local authorities. The supply is to be derived from wells in the parish of Eynesbury near the River Ouse. Flood water is to be kept out of these wells; and they are to be at least 150 yards from the river. The water is to be filtered if necessary, on the order of the Local Government Board. Domestic water-rates are to be from 9 to 7 per cent., with the highest rate for inns. The charge for meter supplies is to be 1s. 6d. per 1000 gallons; and 1s. per 1000 gallons for sanitary and public supplies. The East Huntingdon Water Act, 1887, is repealed so far as this district is concerned. The undertaking may be acquired by the District Council within two years.

The Weymouth Water-Works Act extends the limits of supply to include the parishes of Broadwey and Chickerell and the former parish of Buckland Ripers. Additional 5 per cent. capital to the amount of £60,000 is to be raised, carrying the usual borrowing powers. New water-works are authorized, comprising a main from the existing pumping-station to the parish of Wyke Regis. The land for the purpose is to be acquired within three years, and the works finished within five years. The Weymouth Company are to buy out the Broadwey and Upwey Water Company, Limited, for the sum of £1200. The Company are to charge the Weymouth Corporation the same price for water supplied for public purposes as they would charge a trader for a like quantity; and they must appoint one of their servants to act as turncock for the Corporation for a wage of 6d. per hour payable by the Corporation. An agreement for the supply of water to the Admiralty is confirmed.

The following Acts are those of local authorities:—

The Chichester Corporation Water Act authorizes the Corporation to purchase the undertaking of the Chichester Water-Works Company, according to the terms of a scheduled agreement. The limits are defined. The right to supply Bosham and Funtington is reserved to the Westbourne Rural District Council. The water rights of the owner of the Fishbourne Mill are protected. The rate for water supply for domestic purposes will range from 7½ to 6 per cent. "A supply of water for domestic purposes shall not include a supply for a swimming bath." Supplies may be metered by agreement. The constant supply is deferred for one year. The sum of £20,000 is to be borrowed for the improvement and extension of the water-works. The purchase price of the undertaking is to be repaid, mainly, in fifty years.

The Deal and Walmer Water Act empowers the Local Authorities of Deal and Walmer to acquire the undertaking of the Deal Water-Works Company, and vests the property partly in a Joint Board, and partly in each of the authorities. The incorporated Joint Board is to consist of an equal number of delegates from each authority, and its manner of working is prescribed. A standing Arbitrator, to be appointed at the second meeting of the Board, is to decide all disputes arising under the operation of the Act. The undertaking is to be transferred to the Joint Board and the Local Authorities respectively as follows: The Joint Board are to take all the reservoirs, water-works, and distributing plant used in common for the supply of the two districts, after which the Deal and Walmer authorities are to come into possession of their respective distributing plant. Rates for domestic supplies are to range from 10 to 7 per cent. Outlying domestic supplies are to be chargeable 25 per cent. extra. In the case of courts or passages, the supply may be by means of a stand-pipe, at the discretion of the Local Authority; the cost being levied upon the owner or owners. Either of the Local Authorities may agree with any person to supply water for domestic purposes by measure. The authorities are not compellable to supply water for domestic use for less than six months; nor may they charge a water-rate for uninhabited houses. Arrangements are made for the supply of national and public buildings and shipping lying in the Downs or in the Roads near the borough. Within two years the supply must be laid on constantly under pressure. Proper financial arrangements are made, which are rendered somewhat complicated by the tripartite character of the new ownership of the undertaking.

The New Hunstanton Water and Gas Act is for the transfer of the undertaking of the Hunstanton Water and Gas Company to the District Council, according to the provisions of the

Company's Act already summarized. The domestic water-rate chargeable by the Council is 1s. 6d. in the pound of the rateable value. The sum of £5000 is to be borrowed for the improvement and extension of the water undertaking, to be repaid in fifty years.

OBITUARY.

We regret to learn of the recent death of Mr. S. BARK, the Secretary and Manager of the Godalming Gas Company. Deceased was a member of The Gas Institute—having joined that body in 1881; and he had occupied his position at Godalming for many years.

Mr. JOHN HENRY PORTBURY, the Manager of the Teignmouth Gas-Works, died on the 30th ult., after a short illness. At a meeting of the District Council a few days later, the Chairman (Mr. F. Slocombe) alluded to the fact with regret, and said Mr. Portbury was a man of no ordinary ability, and had the fullest confidence of the Council. They would miss him very much. A vote of sympathy with the widow was passed.

PERSONAL.

Mr. C. S. HEARD has been elected a Director of the Guildford Gas Company in place of Mr. Mark Smallpeice, whose retirement was mentioned last week.

Mr. W. G. OWENS has relinquished the management of the Ross (Herefordshire) Gas-Works, to undertake similar duties at Aberavon; and he has been succeeded by Mr. J. O. PASK, of Bungay.

Probate of the will of the late Alderman RIDLEY, the Chairman of the Bury St. Edmunds Gas Company, whose death last March was recorded in the "JOURNAL" at the time, has been granted to his two sons. Deceased left personal estate valued at £17,360.

The partnership of Mr. R. LESLIE S. BADHAM, the Secretary of the Provincial Water Companies' Association, with Messrs. Hargreaves, Parliamentary Agents, having ceased by efflux of time, he will in future carry on business in his own name at No. 18, Abingdon Street, Westminster.

The management of the Rugeley Gas-Works, which for nearly two years and a half has been in the hands of Mr. W. MOULT, has been transferred to Mr. G. W. CROSS, son of Mr. T. Cross, of Cannock. During Mr. Moult's tenure of the position he is relinquishing, he has entirely remodelled the works.

A sensation has been caused in Cambridge by the disappearance of the Secretary of the Gas and Water Companies—Mr. W. PEED—and the subsequent filing of a bankruptcy petition against him by one of his creditors for £4500. He left home on Tuesday, the 28th ult., for London, and was expected back next day. But a telegram was received from him deferring his return; and since then he has not been heard of. A report states that his liabilities are very considerable—something like £200,000; while his assets are only small. Mr. Peed is a solicitor by profession, and was Under Sheriff of Cambridge. A former partner—Mr. Turner—is also missing.

There were 42 applicants for the appointment of Chemist and Superintending Gas Examiner to the London County Council, rendered vacant by the resignation of Mr. W. J. Dibdin, F.I.C., F.C.S.; and the General Purposes Committee of the Council recommend Dr. F. CLOWES for the position. Dr. Clowes is well known to readers of the "JOURNAL," in connection with his investigations on the detection of dangerous proportions of explosive mixtures of combustible gases with air, on which he gave an interesting lecture at the meeting of The Gas Institute last year. He is Professor of Chemistry and Metallurgy in the University College, Nottingham, and President of the Society of Chemical Industry.

Petroleum in Canada.—A synopsis of a report on an experimental boring for petroleum, carried out by Mr. W. A. Fraser at Athabasca Landing, Alberta district, is given by Dr. G. M. Dawson in the annual report recently issued by the Geological Survey of Canada, and is summarized in "Nature." Where the basal sandstone of the cretaceous formation comes to the surface, about 130 miles north of the place of the boring on the Athabasca River, it is charged with bituminous matter; and from the observed dip of the cretaceous rocks, it was hoped that these "tar sands" would be found at a depth of from 1200 to 1500 feet. This estimate has proved to be a little under the mark; but the work that has been done indicates that the top of the tar sands should be reached at about 1800 feet. When Dr. Dawson visited the boring, a depth of 1731 feet had been reached, and it was proposed to continue down to 2000 feet, so as not only to pass through the tar sands, but also to penetrate, for some distance, the rocks—presumably limestones of Devonian age—underlying them. It is pointed out that there can be no reasonable doubt that an important oil-field exists in northern Alberta and Athabasca; and the facts gained by the experimental boring of the Canadian Geological Survey have rendered it possible to estimate very closely the depth at which the tar sands may be looked for along the Athabasca Valley.

COMMUNICATED ARTICLE.

THE DISTRIBUTION OF GAS.

By D. COATS NIVEN, of Calcutta.

The subject of the distribution of gas is, I consider, of primary importance to a gas manager; and yet it is rarely tackled at gas meetings. It is therefore refreshing to find two papers on the subject—one in America, the other in England. The American writer states that the formula required for ascertaining the quantity of gas delivered is as follows:—

$$Q^2 = \frac{D^5 H}{0{\cdot}0000006\, s\, L}.$$

The letters denote the usual factors. There is no doubt that the formula has the appearance of something new; but, on inspection, I find that it is only an old friend in a new dress. The explanation is that the long decimal is equivalent to a vulgar fraction, the reciprocal of which is $(1290)^2$. Accordingly, the equivalent formula is—

$$Q^2 = \frac{(1290)^2 d^5 h}{s l}$$

But this formula simplified is thus—

$$Q = 1290 d^2 \sqrt{\frac{d\, h}{s l}}$$

To test the comparative facility of application of this simplified formula and the American's decimal formula, suppose I want to know the delivery of gas from a 4-inch main at 900 yards, omitting pressure and specific gravity, then—

$$Q = 1290 \times 4^2 (d^2) \times 2 (\sqrt{d}) \div 30 (\sqrt{l})$$

$$1376 = \frac{1290 \times 16 \times 2}{30} = \frac{41{,}280}{30} = 1376$$

This is so simple that it might be done mentally. The decimal formula for time could be called a schoolboy's exercise.

The American has changed the 1350 coefficient to 1290, and given a long decimal fit for no practical work. Granted, there is shown a little arithmetical manipulation, which may be called "cuteness." When he speaks of *pumping* air into pipes to test them, I think that Braddock and Cowan could give him some information regarding a force meter.

The English essayist has got the impression that a number of gas managers have incorrect views about the size of pipes; and he has taken upon himself the very laudable task of instructing them. He says: "With reference to the replacing of one main by another of larger diameter, a fallacy exists in some quarters that the supplying capacities of the mains vary as the squares of their diameters. As a matter of fact, the capacity variation is as the square root of the fifth power of the diameter expressed by the formula: Relative discharging capacity of pipes $= \sqrt{d^5}$. As an example of the application of the above formula, a 12-inch main under 2 inches pressure delivers 33,600 cubic feet of gas per hour at the end of 2000 yards. It is required to find what a 14-inch main under the same conditions will deliver. The square roots of the fifth powers of the diameters (12 and 14) are as 1 : 1·47 ∴ 33,600 × 1·47 = 49,392 cubic feet, the discharging capacity required. The figure given in Mr. Barlow's tables for corresponding conditions is 49,400 cubic feet." To analyze the paragraph quoted is to state: (1) That there is the assertion that an error about gas delivery in pipes lurks in the minds of a number of gas managers. (2) That the rule as brought forward for the capacity of pipes in delivery should be applied.

Now, while reading this lucubration of the essayist, I thought that it was not unimportant to know something of the history of a subject prior to its treatment. Had the essayist done so, he would have found that in 1853 Dr. Pole's essay on the motion of elastic fluids through pipes was contained in Clegg's "Treatise on Coal Gas." Further, that Mr. Barlow's tables simply concretely illustrated Dr. Pole's essay. It is common property, as shown in King's "Treatise," and in Richards' and Newbigging's works. In Hurst's "Architectural Handbook," it is stated as a long well-known fact "that the relative capacity of pipes for supplying gas varies as $\sqrt{d^5}$." Since this principle is embodied in all text-books on gas, and since the most ignorant gas manager (who must, of course, employ Mr. Barlow's tables) can at a glance, on the least comparison, verify the principle, I ask: Is it not conceited impertinence to assume that a number of gas managers are so ignorant? At all events, the assertion of the essayist is groundless, and a pure assumption.

Now for the rule. He evidently thinks it is new. But $\sqrt{d^5} = d^{\frac{5}{2}} = d2\frac{1}{2} = d^2\sqrt{d}$; and this is part of the old formula. Therefore there is nothing new in it. Still it may be said that $\sqrt{d^5}$ is easier of application. Let us take his own illustration. The fifth power of 12 is 248,832; and the fifth power of 14 is 537,824. The square root of 248,832 is 498; and of 537,824 it is 733. But divide 733 by 498, and the quotient is 1·47, which multiplied by the 33,600 cubic feet gives 49,392. So much for the so-called new rule in working.

Now try the old rule, thus: $d^2\sqrt{d}$. The square of 12 is 144, and multiplied by the square root of 12 or 3·46, the total is 498. The square root of 14 is 196, and multiplied by the square

root of 14, or 3·74, the total is 733; and $733 \div 498 = 1{\cdot}47$, the answer required.

The simplicity of the old rule in working is the reason why it, and no other, is applied. In such matters, every man has his own short and easy method; and I may say I do all my distribution problems mentally. But if I had figures to work with, as suggested by the rule to be applied of the English essayist, I should require a clerk to work out my calculations. I do not wish to be considered churlish, or discouraging to essayists; but, as the result of hard study for years, I would suggest that simple subjects should at first be grappled, and the strength thus acquired will equip writers for others more complex.

During the past years, I have noticed, in the excellent addresses given by our most able gas experts, some books recommended for study and application. But, in my experience, there is one book which is never pointed out, and that is on "Logic." If you consider that logic is called the "science of sciences and the art of arts," it must be plain that, unless there be good natural ability, there will be more or less failure of the proper and effective application of the knowledge a man may possess. To test a proposition, natural routine may do much; but to give confidence in testing it, logic is one's only friend. It destroys all rambling or irrelevancy, and enables a man to make the best use of his capacity. I admit that in the old country logic is not so essential as it is here; for there, if one is in trouble, a hundred are ready to help him out, whereas here there is no help. Hence I fall back on the confidence given me by logic, in the same way that a boxer falls back upon his confidence in fence should he be attacked by powerful odds against him. In my opinion, a man who wishes to be a gas manager abroad should, besides possessing the necessary qualifications, be a logician; for if he is, he will have less trouble and annoyance in his daily routine of procedure.

"First Principles of Electricity and Magnetism."—As indicated by the title, this book is intended for beginners in practical work. Its contents consist of an amplification of some articles which appeared in the "Electrical Engineer"—of which the author (Mr. C. H. W. Biggs) is Editor—based on the syllabus of the City and Guilds of London Institute. Mr. Biggs acknowledges his indebtedness to several authorities for some of his matter; but he claims to have supplied his reader with information not usually found in similar books. The text is divided into nine chapters; at the end of each of which there are questions upon the subjects dealt with. The book should prove useful to students intending to submit themselves for examination at the Institute. It is issued by Messrs. Biggs and Co., Salisbury Court, E.C., at a very reasonable price.

"Manual of Electrical Undertakings, 1897."—We have received from the publishers, Messrs. P. S. King and Son, of Westminster, a copy of the above-named work. It is the second year's issue of a book of which favourable mention was made in our columns towards the close of last year. We then remarked that it was susceptible of improvement; and the present volume bears evidence of an appreciation of this fact by those who are responsible for its production. The contents have been again compiled under the direction of Mr. Emile Garcke, M.Inst.E.E., F.S.S., who has introduced some valuable new matter which has increased the size of the book by one-third, though the historical section of the first issue has been excluded. The volume for 1896 contained particulars of 172 undertakings, having an aggregate subscribed capital of £61,109,525; whereas the one under notice deals with 274, the share and loan capital of which amounts to £69,209,478. The book contains a directory of officials, and lists of electrical companies registered since 1856, with the year of registration and the amount of capital. The maps which are given of the electricity supply areas and of the constructed or authorized electrical railways in London, will prove useful additions to the "Manual," the whole of the data in which are stated to be derived from official sources.

Lunge's "Tables for Gas Analysis."—Messrs. Williams and Norgate, of London, Edinburgh, and Oxford, have forwarded a copy of Professor G. Lunge's "Tabellen für Gasanalysen, Gasvolumetrische Analysen, Stickstoffbestimmungen," &c., recently republished at Brunswick, in a form suitable for suspending on the walls of a laboratory. The first table gives the volume at 0° C. of any quantity of gas from 1 to 100 c.c. at temperatures ranging from 1° to 29° C. The second table gives the volume at 760 mm. of any quantity of gas within the above-mentioned range at pressures from 680 to 770 mm. of mercury. A third table, which might with advantage have been extended to include half degrees, gives the tension of aqueous vapour for temperatures from 0° to 26° C. (latitude not stated). These three tables furnish a complete apparatus for the corrections of volume necessary in gas analysis, and do away with the tedious calculations otherwise needed, the labour of which is considerable, even with a table of logarithms at hand. The fourth table gives the weight of certain nitrogen compounds corresponding to 1 to 9 c.c. of nitric oxide; and the fifth and last table shows the weight of certain substances corresponding to volumes of gas evolved in determinations by the Dumas method with the nitrometer. These two tables would prove useful in the laboratories of gas-works where liquor and spent oxide are worked up, or to any laboratory dealing with the products of these residuals.

TECHNICAL RECORD.

ACETYLENE GAS.

Pronouncement of the Home Office.

The Explosives Department of the Home Office has recently had under consideration the question of the restrictions to be applied to the manufacture and keeping of acetylene gas, and has conducted various experiments with the object of gaining information on this matter. The results show conclusively that acetylene gas *per se*, when under a pressure of something less than two atmospheres, is violently explosive; whereas, at a pressure of less than one-and-a-half atmospheres, it appears to be reasonably free from liability to explosion, provided it is not admixed with oxygen or atmospheric air.

For commercial and practical purposes, it is considered sufficient to allow a pressure of 20 inches of water above that of the atmosphere (*i.e.*, roughly about one-and-one-twentieth atmospheres); and it is accordingly proposed to draw the safety-line at this point, and to declare acetylene, when subject to a higher pressure, to be an "explosive" within the meaning of the Explosives Act, 1875.

In France and Germany, the authorities have fixed the limit of danger at one-and-a-half and one-and-one-tenth atmospheres respectively, and have imposed prohibitions or restrictions on the keeping or manufacture of the gas when it is at a higher pressure.

AN INCANDESCENT OIL-LAMP.

For some years we have assiduously watched the oil-lamp trade with the object of taking account of whatever progress might become visible in the application of burning oils to the purpose of lighting; but season has followed season without bringing out any noteworthy novelty in oil-lamps. Latterly, however, the records of the Patent Office have shown a series of attempts to adapt the incandescent principle of producing luminosity to the ordinary oil-lamp; and it now becomes a duty to signalize the advent into commerce of what appears to be a fairly satisfactory solution of this by no means simple problem. When it is known that the lamp in question has been adopted by the Incandescent Gas-Light Company, Limited, and that it is the only one for which Welsbach mantles are manufactured or can be used, no further credentials of the seriousness of the new departure in the oil-lamp trade are needed.

The new lamp is styled the "Era" Incandescent Petroleum Lamp; and it is actually on view at Palmer Street, Westminster. At present, the system is only adapted to one size of lamp-burner—that known as the "14-line duplex," which we are informed is the size most generally in use. The new attachment comprises burner, mantle, and chimney (everything except the oil reservoir); and it will be retailed at 9s. 6d. The mantles are a special make, being shorter and of larger mesh than the gas mantles, and they yield a light of about 50 candles, with a consumption of one-third of the amount of oil burnt by an ordinary lamp of the same illuminating power. This means in practice that the oil reservoir needs filling only one-third as frequently, and the labour of wick-trimming and burner-cleaning is greatly reduced.

Readers will be more interested in learning how an ordinary luminous oil-flame is rendered atmospheric. This is done, and done very effectually, by taking advantage of the sharp air-blast producible by a long chimney. The chimney of the "Era" lamp is at least twice the length of an ordinary lamp-chimney, which is not pretty to look at if the long glass shaft is not hidden by a silk or paper shade—which, of course, it would be in the ordinary way. There is no noticeable peculiarity about the burner; but the "spreader," which is placed in the middle of the annular wick-tube, has a number of holes running horizontally round it. When the lamp is to be lighted, the gallery carrying the globe (if there is one) and chimney is lifted in the usual fashion of good lamps; and a light is applied to the wick. This light burns low; and when the gallery is lowered, all that is done is to turn up the wick as in an ordinary lamp. Immediately, without anything else being touched, the blast of the long chimney comes into operation. The luminosity of the flame disappears, and the flame itself is lifted quite away from the wick, and is caught upon the mantle above, which it renders incandescent. Thus it is truly an atmospheric oil-gas flame that does the work, and no mechanical complications go to the production of the effect. If the wick is turned up too high, the chimney gives warning of the fact by emitting the loud note of the pyrophone. If any accident should destroy the mantle, and another one does not happen to be at hand, the replacing of the gallery by a cap of different pattern, supplied for the purpose, restores the lamp to the ordinary condition of burning with a luminous flame.

It remains to be seen how the "Era" lamp will take with the public. The competition will not be with gas, but with the ordinary oil-lamps; and it will be surprising if the greater economy of the incandescent system does not cause it to supersede the common style of lamp with many of the best customers of the oilman.

NOTES ON THE ENRICHMENT OF COAL GAS.

(*Continued from p. 741.*)

The next point for consideration is the nature of the illuminating hydrocarbons, and the extent to which each contributes to the illuminating value of the gas. In dealing with this point, it must be borne in mind that the basis of carburetted water gas is different from that of coal gas. Carbonic oxide is a large constituent of the diluent gases; and due allowance must be made for any effect its increased volume may have on the value of the so-called illuminants. A comparison of the amounts of the different illuminants in 15-candle carburetted water gas with their amounts in coal gas, would give the clearest idea of the true effect of the diluent gases in each case; but 15-candle carburetted water gas has not been made—or rather no analyses of it have been published. Less reliable conclusions may be drawn from the effects of simple water gas, disilluminated coal gas, hydrogen, carbonic oxide, and methane on the illuminating values of certain hydrocarbons—such as ethylene and benzene. Professor Percy Frankland made some observations on the illuminating power of ethylene diluted by various proportions of hydrogen, carbonic oxide, and methane. They showed clearly that methane was superior to hydrogen, and hydrogen to carbonic oxide, though the superiority of methane was not evident until it formed more than about 40 per cent. of the mixture. Professor Frankland's interesting results do not establish the part played by the diluents in carburetted water gas. Some researches undertaken by Herr L. Walther, at the instigation of Dr. Bunte, throw more light on this matter.* Carbonic oxide was found to require a larger percentage of hydrocarbons than hydrogen for the same degree of illuminating power; and the difference was greater for paraffin than for aromatic hydrocarbons. Water gas, however, required only about 1·13 times the weight of *either* benzol *or* hexane that was needed by hydrogen per candle power. The ratio was the same for the aromatic and paraffin hydrocarbons; and therefore it may be fairly assumed that the relative illuminating values of paraffins and aromatic hydrocarbons are preserved, if water gas takes the place of hydrogen as a diluent. No great error will consequently be introduced into an estimation of the relative values as illuminants of the hydrocarbons of different series, if it be assumed that their relative values for 1 per cent. by volume are the same for carburetted water gas as for coal gas.

Some of the older analyses of American water gas state the percentages of ethylene and benzene, instead of grouping together all the hydrocarbons absorbable by bromine. If those figures be reliable, benzene is only found to the extent of about 2 per cent. in that class of water gas. But Professor Lewes, among others, has insisted on the fact that paraffins other than methane are present in English carburetted water gas in quite appreciable quantity. Their effect on the illuminating value of the gas must not be ignored. It seems improbable that carburetted water gas made at high heats from Russian or Scotch oil ever contains less than 2 per cent. of its volume of benzene vapour. It is quite easy to separate, by vigorous dry scrubbing of 25-candle purified carburetted water gas at temperatures above 32° Fahr., a large quantity of light oil. An examination of this oil shows that it contains nearly half its volume of pure benzene, and also a fairly large proportion of toluene, xylenes, &c., and some naphthalene. The liquid contains very little of the non-aromatic hydrocarbons. Dr. E. G. Love has pointed out that carburetted water gas of from 28 to 29 candle power is reduced to 13·5-candle power by compression to 16 atmospheres, with removal of the condensation products†. The illuminating hydrocarbons are simultaneously reduced from 14-16 per cent. to 13·2 per cent. He points out that this very small reduction in the percentage of hydrocarbons—say, about 2 per cent.—is accompanied by a loss of half the total illuminating power of the gas. The heavy hydrocarbons removed are chiefly benzol vapour, the small proportion of which therefore is responsible for more than half the total illuminating power of the gas. In the fixing or superheating of raw carburetted water gas, paraffins, and probably olefines also, are decomposed, with splitting off of methane, and formation of less highly saturated carbon compounds.

An increase of volume, amounting, according to Dr. Bunte,‡ to 20 to 30 per cent. when the vapour of a simple paraffin (pentane) is "fixed" in the presence of water gas, is observed to be an effect of the superheating of the raw gas. Simultaneously with the increase in volume of the gas, the illuminating power rises slightly, indicating that, volume for volume, the hydrocarbons formed by the fixing process are more potent illuminants than those present in the unfixed gas. Herein lies the economy of "fixing" or superheating a raw gas; the paraffins are broken down, and yield unsaturated but more highly illuminating hydrocarbons. Similarly, doubtless, the olefines would be broken down to hydrocarbons of another series ranking higher in the scale of illuminants. The practical consummation of the fixing process would be the production of aromatic hydrocarbons and a large volume of diluent gases. But unless the volume of diluents be very large—and therefore the candle power of the fixed gas low—they do not suffice to hold in suspension at low temperatures the requisite volume of aromatic hydrocarbons; and thus the "fixing" is seldom so thorough or complete as the production of the highest sperm value from the oil demands. If the carburetted water gas is to be mixed almost as soon as produced with coal gas in the proportion necessary to raise the illuminating power of the latter by about 2 candles, there is no objection to the "fixing" of the water gas being very thorough. If there be actually about 2 per cent. of benzene vapour, and 10 per cent. of olefines, in 25-candle water gas, then about $\frac{1}{16}$ of the illuminating value of the gas would be due to the benzene, about $\frac{3}{16}$ to the olefines, and the remainder to the methane and other paraffins. These figures are precisely those found (*ante*, p. 529) for the proportions in which the same hydrocarbons contribute towards the total luminosity of coal gas. The diluent gases of the water gas contain only about 22 per cent. of methane; while those of the coal gas contain 38 per cent. Therefore a higher expenditure of benzene and olefines per candle in the case of water gas is not surprising. The diluent basis of water gas is less good than that of coal gas; but the illuminating power of the gas is due to the same hydrocarbons existing in it in the same relative proportions as in coal gas. In this sense, therefore, carburetted water gas may be regarded as the agent which more nearly than any other enriches coal gas with similar hydrocarbons in similar proportions to the hydrocarbons of coal gas itself. The "natural enriching agent" of coal gas is an expression used towards cannel by some writers, and towards benzol by others. But analogy should not be looked for in the raw material or the process of production, so much as in the nature and proportions of the actual illuminating hydrocarbons. According to this view, carburetted water gas at present has the best claim to the distinction. The different proportions of the diluent gases show that it is possible a better claim may be substantiated in the future by some novel enriching gas. The claim to be the natural enriching agent of coal gas, however, has little more than a sentimental value.

The statements herein must be taken to refer only to water gas made for enriching purposes, and of not higher than 30-candle power. Richer gas, and gas made for distribution without dilution, are not considered in these notes. The illuminating power of water gas is ascertained by its consumption in the most suitable flat-flame burner, at the most suitable rate for the development of the highest sperm value from it. It must be observed that its illuminating power is never given on the basis of its enrichment value. Moreover, its enrichment value has been almost universally assumed to be strictly proportional to its illuminating power when burned without dilution. Such is also the case with cannel gas, as has already been pointed out (*ante*, p. 585). Mr. Holgate assumes that the proportion holds good in his computations of the cost of enrichment by cannel gas and carburetted water gas, though he certainly appends a footnote pointing out that the enrichment value of carburetted water gas has been observed to be higher than the direct illuminating power, by about 20 per cent. at Beckton,* and by from 6 to 10 per cent. at Glasgow.† The difference in the observations is, he adds, probably due to the difference between the illuminating power of the unenriched gas in the two places. The matter deserves more than the decent obscurity of a footnote allusion. There is fortunately more definite information on the point than Mr. Holgate was aware of at the time of writing his communication.

Mr. John Methven has stated that, during six months' working at Beckton in 1895, the number of candles per gallon of oil was 1259 by direct testing of the purified water gas, but 1827 by its enrichment value when added to coal gas.‡ Mr. Methven's prestige as an expert photometrist is a sufficient assurance to gas engineers of the value of such a statement by him. But those familiar with the elaborate system of gas testing introduced by him at the Beckton works, know that he has means of accurately gauging the practical enrichment value of the water gas which are quite out of reach of most gas managers. Briefly, the unenriched coal gas, the carburetted water gas, and the mixed gas are tested at intervals of half an hour, day and night throughout the year. The enriched gas is again examined at similar intervals at a testing-station about a mile from the works. Needless to say, the latest photometrical apparatus is used; and nothing that Mr. Methven's ripe experience could suggest is wanting to make the observations perfectly reliable. The six months' average of such a series of tests is as unimpeachable a value as can be hoped for in the present position of the art of photometry. The large scale of working at Beckton, and the small army of gas-testers required to carry out the elaborate system of gas examination described above, together with Mr. Methven's peculiar aptitude for the supervision of such work, give his explicit statement concerning the enrichment value of water gas an authority no other has. The statement has such a wide significance, that it is highly satisfactory that it comes from an unimpeachable source.

The statement actually warrants the conclusion that nearly, if not quite all previous estimations of the illuminating value of carburetted water gas for enriching purposes have been underrated by almost 50 per cent. If the sperm value obtained from the oil be the criterion of the efficiency of the process, then

* See "JOURNAL," Vol. LXVI., p. 180.
† *Ibid.*, Vol. LXVI., p. 340. ‡ *Ibid.*, Vol. LXVI., p. 181.

* See "JOURNAL," Vol. LXV., p. 1070.
† *Ibid.*, Vol. LXVI., p. 230. ‡ *Ibid.*, Vol. LXVII., p. 1164.

TABLE I.—*Cost of Carburetted Water Gas.*

Locality	Be'fast.	Blackburn.	Halifax.	..	Glasgow.	..	..
Authority	J. Stelfox.	R. Ogden.	T. Holgate.	A. G. Glasgow.	A. Wilson.	C. Woodall.	Estimate by the Writer.
Reference	"JOURNAL," LXIII., p. 1229.	"JOURNAL," LXVI., p. 1141.	..	"JOURNAL," LXIX., p. 127.	"JOURNAL," LXVI., p. 230.	"JOURNAL," LXIX., p. 1241.	..
Candle power of gas	21·19	23·04	24·00	24·00	28·53	20·00	22·50
Price of oil per gallon	2·5d.	3·625d.	2·5d.	3·0d.	2·25d.	2·75d.	2·5d.
„ „ coke per ton	15s. 0d.	6s. 8d.	6s. 8d.	12s. 0d.	5·. 0d.	15s. 0d.	9s. 0d.
Ga lons of oil per 1000 cubic feet.	3·15	3·27	3·45	3·50	4·47	3·0	3·25
Pounds of coke „ „ „ „	46·95	36·8	45·0	40·00	47·00	40·0	40·00
Expenditure per 1000 cubic feet—							
Oil	7·875d.	11·85d.	8·63d.	10 50d.	10·057d.	8·25d.	8·125d.
Coke, &c.	3·774	1·31	1·61	2·50	1·256	3·21	1·929
Labour, superintendence, and purification	1·473	1·01	1·65	2·30	2·420	Details not given.	1·900
Water	0·100	0·39	0·10	0·20	0·240		0·240
Repairs, maintenance, and sundries.	0·750	0·75	1· 7	0·50	0·750		0·750
Interest and sinking fund	0·860	0·86	0·85	0·86	0·860		0·860
	14·832d.	16·17d.	13·92 l.	16·86d.	15·583d.	..	13·804d.
Value of residuals	0·745	..	..	0·50	..	..	0·250
Net cost in gasholder per 1000 cubic feet	14·087d.	16·17d.	13·92 l.	16·36d.	15·583d.	16·00d.	13·554d.
„ per 1000 cubic feet per candle	0·660d.	0·70d.	0·58d.	0·68d.	0·55d.	0·80d.	0·60d.
Candles per gallon of oil	1345	1409	1391	1371	1276	1333	1385
„ at enrichment value	1951	2043	2017	1988	..	1933	2008
Net cost in gasholder per 1000 cubic feet per candle enrichment value	0·46d.	0·48d.	0·40d.	0·47d.	..	0·55d.	0·40 l.
	* ‖ §	* ‖ §		§	* † ‡ §		

NOTE.—In the columns indicated, certain items appear to have been omitted in the original computations. For the sake of making all the totals comparable, additions have been made as follows:—* Supervision, 0·25d.; † Water, 40 gallons, at 6d. per 1000 gallons, 0·24d.; ‡ Repairs and maintenance, 0·5d.; § Interest and sinking fund, 0·86d. per 1000 cubic feet; ‖ Sundries, 0·25d. The same figures have been used in the last column.

TABLE II.—*Cost of Enrichment by Carburetted Water Gas.*

——	At Halifax.		In London.		——	
Cost per 1000 cubic feet of—	d.		d.		d.	
15·0-candle coal gas	9·00		12·00		12·00	
21·0 „ carburetted water g s.	..		13·50		..	
22·5 „ „ „ „	..		..		13·55	
24·0 „ „ „ „	13·92		..		..	
Taking the water gas at its	Illuminating Power.	Enrichment Value.	Illuminating Power.	Enrichment Value.	Illuminating Power.	Enrichment Value.
Cost per 1000 cubic feet of 17-candle mixed gas	10 093	9·497	12·50	12·20	12·413	12·166
Cost of 2 candles enrichment per 1000 cubic feet	1·093	0·497	0 50	0·20	0·413	0·166
Cost of enrichment per candle per 1000 cubic feet	0·546	0·248	0·25	0·10	0·206	0·083

supposing the oil used at Beckton had on an average a specific gravity of ·870, a ton of oil, instead of yielding 324,192 candles, would give an effective 470,452 candles. But a better duty is obtained from the oil at other works than Beckton; and it follows that many of them must secure from a ton of oil an enrichment value of over 500,000 candles. In computing the cost of enrichment of common coal gas, the candle power of carburetted water gas between 20 and 25 candles by direct observation, should be multiplied by 1·45, and the product taken as the true illuminating power of the gas for the purpose of enrichment by a few candles.

The cost of water gas for enrichment purposes varies considerably with the local conditions; but it is mainly dependent on the price paid for oil. Suitable oil is obtainable in many places at 2¼d. per gallon; and Mr. Holgate has adopted this price in his estimate of the cost of the gas, though in his estimates of the cost of oil gas he has charged the oil used at over 3d. per gallon. In these "Notes" an estimate of the cost of oil gas with oil at 2¾d. per gallon has also been given (*ante*, p. 681). In Table I. are some figures showing the cost and consumption of oil and fuel used in the manufacture of carburetted water gas.

The amount allowed for interest and sinking fund agrees with Mr. Holgate's estimate, which is based on the cost of a plant capable of making 1 million cubic feet of gas per day, and 200 millions per annum, being £12 per 1000 cubic feet. This estimate of cost agrees closely with the cost of the Blackburn plant, as stated by Mr. S. R. Ogden.* In the cases to which Mr. Methven's observations on the enrichment value of carburetted water gas appeared applicable—*i.e.*, to gas between 20 and 25 candles—figures showing the candles per gallon of oil and the cost per 1000 cubic feet per candle on the enrichment basis are added. These figures are comparable with those given for Peebles oil gas and oxy-oil gas under the same headings. The estimate given in the last column is based on oil costing 2¼d. per gallon on the works; and the value of coke being 9s. per ton. This value was recently stated by Mr. G. C. Trewby† to represent fairly the price of coke in London. The net cost of 22·5-candle gas then appears to be about 13½d. per 1000 cubic feet. Mr. A. F. Browne stated that this was the mean cost of 21-candle gas at two London installations.‡

The cost of enriching coal gas may be readily deduced on the basis of any of the above estimates. Table II. gives the cost according to Mr. Holgate and Mr. Browne, and the estimate of the last column of the above table. The figures based on the enrichment value of the gas depend on the ratio between illuminating power and enrichment value observed by Mr. Methven.

These figures compare favourably with those found for other enriching gases. High candle power carburetted water gas is apparently more cheaply produced than the qualities up to 25 candles, which have been so far considered, since the increased expense of its manufacture is almost solely the additional cost of oil. But the use of large quantities of oil in a carburetted water-gas plant tends to produce a less uniform gas, as the abstraction of heat from the carburetter by the gasification of the oil is greater, and the oil at the close of the run is not well gasified. The hydrocarbons in rich carburetted water gas appear to consist more largely of lower temperature products than those found in the poor gas already dealt with; and the difference between the illuminating power and enrichment effect appears to decrease with the increase in candle power. When the gas exceeds about 35-candle power, a stage appears to be reached at which it becomes equally economical to enrich coal gas with simple oil gas, and abolish the use of water gas as a carrier of the oil gas. An important advantage of carburetted water gas consists in its value as a means of obtaining a large volume of gas from coke; and it is chiefly this advantage which has tended in recent years to give carburetted water gas a preferential position as an enriching gas. This advantage is fully reaped only when tolerably poor water gas is manufactured. The relative merits of oil gas and rich water gas formed the subject of some very pertinent observations in these pages recently.*

Mr. W. Young has devised a form of generator, or internally heated retort, for the production of oil gas mingled with a small quantity of water gas. Mr. Holgate gives an illustration of this apparatus similar to that furnished in these pages.† In an appendix to his paper, he gives a brief description of the plant, which was fully described in the "JOURNAL." The oil for gasification is injected into a large free space above the bed of fuel in the generator. The surrounding walls have been previously raised to incandescence by the combustion of the producer gas formed during the blow; and the gasification of the oil is partially effected by means of radiant heat from the walls, and

* See "JOURNAL," Vol. LXVI., p. 1143.
† *Ibid.*, Vol. LXIX., p. 1243. ‡ *Ibid.*, Vol. LXVII., p. 1162.

* See "JOURNAL," Vol. LXIX., p. 1293. † *Ibid.*, Vol. LXIV., p. 237.

partially by the top layer of fuel. Before and after the make of oil gas, water gas is made by injecting steam at the base of the fuel-bed. Only so much water gas is ordinarily made as will suffice to wash out the producer and spent gas and the oil gas from the apparatus. Since the make of oil gas is continued until the heat no longer suffices for its proper manufacture, the water gas made at the close of a run must be produced under bad conditions of the fuel-bed, and be heavily charged with carbonic acid. The apparatus can, of course, be used for the continuous production of water gas. The carbon separated from the oil in the course of its gasification is deposited on the fuel-bed, and is therefore eventually used for heating the retort and the production of water gas. With many oils, the amount of carbon so deposited should render the use of other fuel unnecessary. The illuminating value of the gas produced in this apparatus is said to be lower by about 5 per cent. than that of ordinary Peebles oil gas; but the sperm value per gallon of oil is the same. The oil gas is condensed and scrubbed on the same principle as the Peebles oil gas made by the externally heated retorts.

The Discovery of Thiophene.—In the brief notice which appeared in the "JOURNAL" for Aug. 31 of the death of Dr. Victor Meyer, who succeeded Bunsen as Professor of Chemistry at the University of Heidelberg, it was stated that he was the discoverer of thiophene in benzene. This would almost lead one to conclude that the discovery was the outcome of research, whereas it seems to have been the result of an unsuccessful lecture experiment. According to "Nature," some benzene prepared from benzoic acid was shaken with strong sulphuric acid and isatin, and failed to give the usual blue coloration. Further investigation revealed the fact that this coloration was due to an impurity in ordinary coal tar benzene—viz., thiophene. The discovery of this remarkable substance was of great importance; giving as it did a deeper insight into the nature of aromatic substances. Six years after the discovery of thiophene, Dr. Meyer was able to publish a monograph, "Die Thiophengruppe," containing a masterly account of thiophene and its derivatives—practically the whole of the work having been carried out in his own laboratory.

The "Manjak" of Barbados.—A peculiar product of the Island of Barbados, which appears for the first time in the list of exports for the past year, is "manjak," or glance pitch, the use of which in connection with gas making was dealt with in an article by Mr. J. Harger Pye which appeared in the "JOURNAL" for April 20 last. According to the latest official report of the Acting-Governor, manjak is of the nature of petroleum in a bituminous form, and when mixed with infusorial earth can be used for fuel. It is found in veins like coal seams, and has great heating powers when ground into fine dust. Its principal drawback is its extremely low melting-point; and experiments are being made to discover a substance with which it can be properly combined for purposes of steam fuel. One or two shafts have been sunk in various places on the northern end of the island, and about 1250 tons of the substance have been extracted; some being sent to the United Kingdom. Its value is given at £2 per ton. There are indications of a large quantity of the material in Barbados; but its successful development is still in the future. It is thought that there is some connection between the manjak, the oil-bearing rock, and the pitch lake in Trinidad. Mr. Pye, it may be remembered, did not consider manjak suitable for taking the place of gas coals or cannels entirely; but it seemed to him that it would be found to rank high as an enricher.

The Denayrouze and Bandsept Burners.—At the opening meeting of the Ipswich Scientific Society last Wednesday, the Borough Gas Examiner (Mr. E. C. Sayer) gave a demonstration and description of the Denayrouze and Bandsept burners. The first sample of the former type exhibited consumed 7 cubic feet of gas and 70 cubic feet of air, mixed by means of the electrically-driven fan; in the case of the second—the improved burner—the mixing was effected without any mechanical aid. Welsbach mantles were used; and the result was the production of an exceedingly beautiful and steady light. The third burner shown was a Bandsept, consuming 5 cubic feet of gas per hour; and it gave very good results. The exhibition was one of extreme interest to the members. Mr. Sayer, as our readers are aware, has been experimenting with the Bandsept burner; the one tested being constructed in accordance with the patent specification which has appeared in our columns. He finds that, if he uses one of the long Denayrouze mantles, the consumption of close upon 5 cubic feet of gas, at 20-10ths pressure, with the air-holes in the body fully open, and without a chimney, will produce a light equal to 120 candles. He has checked this result with a Denayrouze 9-feet single burner, as well as with a 3¾-feet Welsbach; and he has come to the conclusion that their respective illuminating powers are as follows: Welsbach, 50 candles; Denayrouze, 150 candles; Bandsept (using a long mantle), 120 candles. The tests were made without a chimney. Mr. Sayer began with 15-candle gas, and used as a standard one of Sugg's "London" argand burners with 6-inch chimney. The photometer employed was a first-class Letheby, with 60-inch scale, as certified by the Standards Department of the Board of Trade.

INCLINED RETORTS AND STOKING MACHINERY AT VIENNA.

Hand stoking has now been abolished for about three years at the Erdberg works in Vienna. On the strength of this relatively long experience of twelve benches of inclined retorts and six pairs of Arrol-Foulis machines, Herr E. Körting, the present Engineer of the works, discoursed at the recent meeting of the German Association of Gas and Water Engineers (*ante*, p. 164) as to the relative merits of inclined and horizontal retorts, and machine and hand stoking. He had collected in tabular form the cost of erection and of working the number of retorts which appeared to show each system at its best; but he was careful to state that the outlay for erection must be taken as applying to Vienna, and that local conditions would considerably modify it. He omitted from the tables the cost of breaking and conveying coal, which amounted to about 0·2d. per 1000 cubic feet of gas for inclined and mechanically-worked retorts. This expense was greater for hand-stoking, owing to the hardness of the local coal, which had to be broken by hand before use.

Mechanical stoking proved satisfactory in Vienna for several reasons. It abolished severe human toil in the retort-houses; and in place of an army of powerful and tough Bohemian stokers, imbued with the barbarous and fanatical manners of their Hussite ancestors, there are now a few intelligent workmen. Brute strength has been superseded by skill and intelligence, much to the relief of the management. Economy, however, remains the chief advantage of the change. The retort-house wages in 1896 were 1·2d. per 1000 cubic feet less than the average for 1892-94; and a further 0·35d. per 1000 cubic feet was saved in the manipulation of the coal. The Arrol-Foulis machines were troublesome at first; but as the workmen became accustomed to them, the working improved. The cost of repairs was considerable; but then the tools for hand-stoking entailed much expenditure. The introduction of the machines did not necessitate an enlargement of the repairing shops. On the whole, the machines proved very satisfactory. The total outlay on an installation of 24 benches with Arrol-Foulis machines, was £26,350; and the cost of producing gas with this type of plant, including interest and depreciation, worked out at about 2·3d. per 1000 cubic feet. This was with 9-feet retorts, set back to back; but if 11-feet retorts in distinct stacks were used, and the charging machines between the two stacks were made also to discharge the retorts by the first push of the pusher-head, a saving could be effected. The cost of producing the gas would then be only about 1·7d. per 1000 cubic feet.

The Coze settings were erected under light iron roofs, according to the ideas of Herr E. Drory. The higher sides of two stacks were placed towards one another; and the coke was discharged outside the house. This method of construction was very cheap, and provided very comfortable conditions for the workmen. Ten Coze settings of nine retorts, 15½ feet in length, in a retort-house of this type, would cost, with the necessary coal breakers, elevators, hoppers, &c., £13,750; and the gas would be produced at a working cost of 1·03d. per 1000 cubic feet. This and the previous estimates include all wages in and about the retort-house, capital charges on the installations, the cost of repairs, and, in the case of the machinery, of the hydraulic supply also. The cost for manual stoking formerly was 2·57d. per 1000 cubic feet.

Stopped ascension-pipes were not a feature of work with the Coze settings. Once in twelve hours a small auger was introduced into each pipe, in order to keep it quite clear. Less scurf was found than with horizontal retorts; and the illuminating power of the gas was as good. To the latter point special attention was directed, owing to the statements that Coze settings in England had produced poor gas. It would pay to work even one Coze setting only, if it could be kept in use throughout the year, and the fluctuations of demand met by ordinary horizontal retorts. The minimum number of benches to which machine stokers could be advantageously applied was about twelve. A works which required eight sets at work in the summer and a maximum of about twenty in the winter, could reap the benefit of stoking by machinery. All moderate-sized and large retort-houses could therefore be fitted with mechanical stokers; but in all new gas-works, even though small, Coze settings were desirable.

THE COST OF STREET LIGHTING BY INCANDESCENT GAS-BURNERS.

The merits of incandescent gas-burners for street lighting were discussed at great length by Herr Kemper, of Dessau, in a paper which he read before the recent meeting of the German Association of Gas and Water Engineers at Leipsic.

On the strength of information collected from the gas-works of 245 towns in which incandescent lighting of streets has been tried, Herr Kemper gave useful summaries, showing the percentage of incandescent burners in use, the descriptions of lanterns, chimneys, and mantles most in vogue, and the most suitable kinds of lighting appliances and governors. He then proceeded to compare the cost of incandescent and flat-flame burners for street lighting. The comparison was not easily

made, for the reason that very diverse opinions are held as to what constitutes efficiency and proper maintenance with either system of lighting. One town uses flat-flame burners consuming only 5·3 cubic feet of gas per hour, and is satisfied to have the lamps alight for 1500 hours in the year. Such a town will scarcely find that incandescent burners can be used at a less expense. But another town which employed flat-flame burners consuming nearly 9 cubic feet per hour, and kept them burning for 3000 hours in the year, would almost certainly find that incandescent burners could be maintained at less cost. Again, in one town the incandescent burners will be governed to a maximum consumption of 3·2 cubic feet per hour, inferior mantles will be used, and they will not be replaced so long as they continue to furnish light. On the other hand, another town will regulate the burners to give a duty of about 60 candles with good mantles, and will replace a mantle so soon as it exhibits even a small defect. Naturally the cost of maintenance is much greater in the latter than in the former of these two towns; and the fact that each burner in one case gives quite 20 candles more light than in the other, is not remembered.

As an example of the method by which the comparison of cost should be made, Herr Kemper takes the following typical case: 500 lamps, previously having flat-flame burners consuming 6·36 cubic feet of gas per hour, are furnished with incandescent burners, which consume 4·24 cubic feet per hour, and have bye-pass jets which consume 0·177 cubic foot per hour. The mantles have an average life of 500 hours; and Jena glass chimneys, one of 1000 hours. The expense of renewal is about 16·2d. per mantle, and 4·8d. per chimney. The cost of each lantern and service-pipe is about 90s.; and interest and depreciation on that outlay may be taken at (say) 5s. Cleaning the lantern and repairs to it, will cost about 15s. This and the last item will be the same whichever burner be used. But an incandescent burner will only be installed at a further cost of about 25s.; and interest and depreciation on this sum should be taken at 15 per cent., or 3s. 9d. The incandescent burners will also require special attention, entailing an expenditure of about 4s. 9½d. per burner per year for the share of a special attendant's wages. The lamps are assumed to be alight for 2000 hours per year, and the gas to cost 2s. 10d. per 1000 cubic feet. Then the flat-flames would each cost per year 36s. for gas, 15s. for cleaning, &c., and 5s. for interest, &c., or a total of 56s. This is equivalent to 0·336d. per burning-hour. The incandescent burners would have annual expenses as follows: Gas, 24s.; gas for bye-pass jet, 3s. 4½d.; four mantles, &c., 5s. 5d.; lantern cleaning, 15s.; special cleaning of burners, &c., 4s. 9½d.; interest and depreciation, 5s.; interest and depreciation on the special outlay for burner, &c., 3s. 9d., or a total of 61s. 4d. This is equivalent to 0·368d. per burning-hour. Thus each incandescent burner entails an expenditure of 0·032d. per burning-hour more than flat-flame burners in this typical case. This figure represents the actual cost of the improved lighting which an incandescent burner affords.

Herr Kemper stated, in conclusion, that except in cases where single squares or streets were indulged in the luxury of the costly electric light, incandescent gas lighting would very soon take the place of flat-flame burners in all German towns. The unfortunate experiences of some towns in the past would cease, so soon as the lesson was learnt that the employment of suitable lanterns and burners and good mantles was the best course. The cost of incandescent gas lighting was sometimes greater and sometimes less than flat-flame lighting, according to the consumption per flat-flame burner, and the number of burning-hours per year. The computation of cost must be made according to the peculiar circumstances of each case.

The Breaking Up of Public Roads.—The Strand District Board of Works have made a proposal that powers should be obtained compelling gas, water, electric light, and other companies to give due notice of their intention of opening up the roadways, and giving the local authorities a power of veto; and we learn that it is receiving general support throughout the Metropolis. A number of Vestries and Local Boards have referred the matter to committees for consideration. The Camberwell Vestry have applied to the London County Council to include in their next General Powers Bill authority to make it compulsory on the part of owners of house property, as far as new buildings are concerned, to lay a pipe of sufficient size to carry connection-pipes from gas and water mains under the paths.

The Cost of the St. Anne's-on-the-Sea Gas-Works Purchase Scheme.—Our readers will remember that one of the prominent Gas Bills of the past session was that promoted by the District Council of St. Anne's-on-the-Sea with the object of acquiring the undertaking of the St. Anne's Gas Company. The Bill was introduced in the Upper House; and their Lordships passed the preamble. This course, however, was not followed by the Committee of the Commons, who did not feel justified in sanctioning the Council's proposals. The expenses attending this abortive project amount to between £3500 and £4000, which will mean the imposition of a rate of 10d. in the pound for a few years. When referring to the rejection of the Bill at the time, we remarked that it was a "pleasant incident" of the parliamentary proceedings of the year; but we may well suppose it will not be so regarded by the ratepayers.

INCLINED RETORTS ON THE CONTINENT.

In the instructive "study" of inclined retorts in Europe, by Mr. F. Egner, which was given in the "JOURNAL" for June 15 last (p. 1355), particulars were furnished of several installations of inclined retorts on the Continent. It was supplemented a fortnight later (p. 1500) by carbonizing statistics of the Coze settings at Cassel. Further details of the working of inclined retorts on the Continent have lately been given in the exhaustive report of a Commission appointed by the German Association of Gas and Water Engineers. The members of the Commission were Herren Reissner (Berlin), Hasse (Dresden), Wunder (Leipsic), E. Drory (Berlin), and Merz (Cassel), all of whom have had large experience of inclined retorts. The report was presented at the meeting of the Association in Leipsic in June last (see *ante*, p. 164). In the following abstract translation from the pages of the "Journal für Gasbeleuchtung," particulars already given in the "JOURNAL" in the papers referred to above have been omitted.

The municipal works at Chemnitz have eleven benches of nine inclined retorts. The shaft does not give sufficient draught for the furnaces; but the settings are kept at uniform heats. The coal is passed over a grid, and pieces more than 3 inches in size are returned to a breaking-machine. Elevators and conveyors bring the coal to the charging hoppers. Three sets or less require three men; and one man is needed for each additional set. The make per retort is 10,242 to 10,595 cubic feet, from five charges of 485 lbs. of *Z*wickau coal per 24 hours (equivalent to 9461 to 9787 cubic feet per ton of coal carbonized). There is no difference in the amount of scurf, or the number of stopped ascension-pipes, between the inclined and horizontal retorts. The "slopers" have effected a saving in wages of 25 per cent., and have worked satisfactorily.

At Dresden, in the two gas-works, there are fourteen settings of nine inclined retorts, 11½ feet long and of elliptical section. Pyrometric tests have revealed no appreciable differences between the heats of the upper and lower tiers of retorts. In the earlier benches, the inclination was 30° to the horizontal. But the coke did not discharge readily; and in all the newer settings, 32° has been adopted, with satisfactory results. Six charges per 24 hours are the rule; and the coals used are Upper Silesian and Saxony cobbles, which do not require breaking.

At Witkowitz, in Moravia, there are five benches of inclined retorts, with Hasse-Didier generators. With 3¾ cwt. charges of Moravian coal, the make of gas is 10,242 cubic feet per retort per 24 hours.

Inclined retorts have proved so satisfactory at the Erdberg works (Vienna) of the Imperial Continental Gas Association, that 26 settings are in course of erection at the Association's works in the Gitschinerstrasse, Berlin. A number of comparisons of the cost of gas production by inclined retorts, Arrol-Foulis machines, and manual stoking are given in a paper presented at the Leipsic meeting by Herr E. Körting. A *resumé* of this paper is given on the opposite page.

The retorts in six benches of nines at the Müllerstrasse works of the Municipality of Berlin are elliptical, 11 ft. 4 in. long, and set at an angle of 32°. In comparative trials extending over thirteen days, of retorts of the same section, the average make per ton of coal was 10,168 cubic feet of 15·56-candle gas with the horizontals, and 9966 cubic feet of 15·34-candle gas with the "slopers." The make per mouthpiece was, however, greater with the inclined retorts; but scurf formed more quickly in them. Nevertheless, they proved so satisfactory that 29 benches are now being erected in the Municipal works in Berlin.

The construction and dimensions of retort-houses and benches for inclined retorts are next dealt with by the Commission. Nine arrangements of the settings are described, by the aid of illustrations. For close-walled retort-houses, the following are the most suitable widths for the stages: Single stack: Upper or charging stage, 16½ feet; lower or drawing stage, not less than 19¾ feet for a stage-floor house, or 16½ feet for a ground-floor house. Double stack: Central charging-stage, not less than 26¼ feet; drawing-stages, each as for a single stack. Double stack: Outer charging-stages, 16½ feet; central drawing-stage, not less than 29½ feet in ground-floor house, or 33 feet in stage-floor house. For the double-stack house, the central are preferable to outer charging-stages. If open-walled houses, the pillars of which correspond with the divisional walls of the benches, are used, an economy of space is achieved. At least 6½ feet clear space must be allowed above the bridge-pipes; and these are generally 5 feet higher with inclined than with horizontal retorts. Whatever conveyor is chosen, it should be simple and easily tended. The rest of the coal-transporting arrangements must be modified to suit the position of each house. The coal hoppers above the benches should contain a 24-hours supply for the retorts, in order that no interruption of work may ensue from a temporary breakdown of the elevator.

Flat-bottomed retorts perhaps discharge the coke more readily than others; and circular and large retorts are certainly bad. Otherwise no particular shape of retort appears to be peculiarly advantageous. The retorts should, however, be 1 to 1½ inches narrower at the upper than the lower end; but the height should not vary. The length of those now in use is from 11½ to 15 feet. The most successful inclination has been 32°; but at Dresden, 33° is about to be tried. The lower

flange of the mouthpieces of the lowest tier of retorts should be not less than 30 inches above the stage-floor. If the distance is much greater, there is difficulty in closing the lids of the retorts in the highest tier. Fixed stops for the coal, attached to the tops of the lower mouthpieces, proved unsatisfactory. A stay fitting in a small depression in the mouthpiece is the best means of keeping in position the stop at the lower end of the retort. Flat-bar in place of sheet-iron stops are in use at Dresden. The ascension-pipes to all retorts now at work are attached to the lower mouthpieces, as stopped pipes and blocking of the upper end of the retort with tar-coke were frequent occurrences when the ascension-pipes were attached to the upper mouthpieces. Movable screens, at a short distance from the upper mouthpieces, are recommended as a protection to the workmen on the upper stage against the heat radiated from the back of the stack. The furnaces should be constructed so that the lower ends of the retorts are heated rather more highly than the upper. If generator firing is impossible, sloping retorts should not be adopted.

Nuts or cobbles, $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in size, give the most even distribution of coal in the retort. With other descriptions of coal, a breaker should reduce it to pieces not exceeding $3\frac{1}{2}$ inches in size. The charging-buckets should contain the whole charge, and should be fitted with apparatus which permits of either slow or rapid charging. The buckets should be suspended from rails in front of the stack.

The economy of ground which inclined retorts effect over horizontal ones for the same gas production, has been studied by Herr E. Drory for the descriptions of coal in use in Vienna. For a yearly make of 318 millions, there are required either 22 benches of nines, $9\frac{1}{2}$ feet long and horizontal; 14 benches of nines, 12 feet long and inclined; or 10 benches of nines, 15 feet long and inclined. The horizontal retorts, with Hasse-Didier generators and hydraulic stokers, and set back to back in a retort-house with close walls, need a house covering an area of 18,729 square feet. The 12-foot "slopers," in two stacks, need a house with close walls covering an area of 10,010 square feet. The 15-feet "slopers," if placed in two stacks, covered by separate roofs supported on iron columns, and with about 23 feet between the two sheds, require an area of only about 5382 square feet. With regard to the use of inclined retorts in small works, it may be stated that they cannot be advantageously adopted if at the slackest time of year less than two benches are at work. Much depends on whether power is available for the mechanical transport of coal.

The Commission continue their investigations on inclined retorts, and will present a supplementary report at next year's meeting of the German Association.

New Works for the Hartlepool Gas and Water Company.—The demand upon the Hartlepool Gas and Water Company for gas is now so great that steps will shortly be taken to increase the output; and the laying down of the first installation of a complete new works on the site acquired by the Company some years ago at Dyke House is in contemplation. The Engineer (Mr. T. Bower) is now engaged with the initial portion of the undertaking, designs, &c. The natural growth of the boroughs, of course, has much to do with the increasing demand; but other factors are the successful introduction of the "penny-in-the-slot" meter, and the call for appliances for cooking and heating purposes. Regarding the water business, new works—including an extension of the pumping plant—are in hand for supplying water to the highest part of the district.

The Gas and Water Finances of the Widnes Corporation.—The statement of accounts of the Widnes Corporation for the year ending March 25 has been issued by the Borough Accountant (Mr. Hoyle). It shows that the total expense of the gas-works amounted to £89,578, of which £70,239 was borrowed, and £19,339 paid out of profits. The present debt on the gas undertaking is £59,294. Notwithstanding the low price charged for gas (1s. 8d. per 1000 cubic feet to ordinary consumers), there was a profit of £2578, in addition to which the cost of the public lighting of the borough, amounting to £1404, was defrayed out of the profits. On the supply of water there was a loss of £428; but against this are to be put the expenses of maintaining the fire brigade, which are charged against the water undertaking, and amount to £201. In the previous year, the profits amounted to £1008. The total cost of the water-works was £175,438, of which £169,996 was borrowed, and £5442 paid out of profits. The present debt on the water undertaking is £138,665.

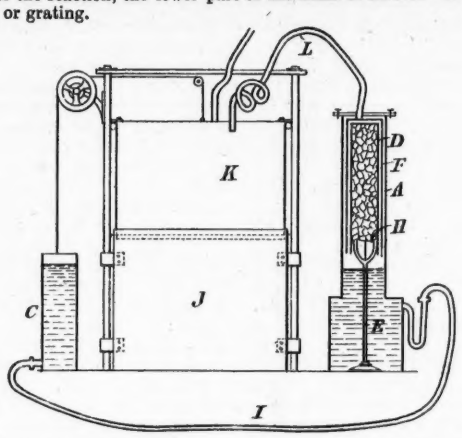
Guildford Gas Company.—The half-yearly general meeting of this Company was held on the 30th ult. Owing to the retirement of the Chairman (Mr. Mark Smallpeice), Mr. D. Williamson presided. The report and statement of accounts presented showed a steady growth in the business, and a great reduction in the unaccounted-for gas. An increased demand was also shown for gas-cookers. A satisfactory report was made as to the extension of the works under the supervision of the Manager (Mr. E. J. Lloyd), including new and enlarged purifiers ready for use, a large gasholder approaching completion, and the sulphate of ammonia and water-gas plants in course of erection. It was reported that a sale by auction of £5000 of the Company's new stock in July last had realized a premium of £1169 5s. on the nominal amount of stock. Full dividends were declared; and a substantial balance was carried forward on the profit and loss account. The following resolution was carried unanimously: "That the shareholders of the Guildford Gaslight and Coke Company, as well as its Directors, hereby express their sincere regret at the retirement of the Chairman, Mark Smallpeice, Esq., and tender to him their best thanks for the faithful and efficient services he has for so many years rendered to the Company." The Secretary (Mr. W. Titley) was instructed to forward a copy of the resolution to Mr. Smallpeice.

REGISTER OF PATENTS.

Generating and Storing Acetylene.—Chesnay, E., and Pillion, L., of Dijon, France. No. 20,090; Sept. 10, 1896. Date claimed under International Convention, Feb. 13, 1896.

This is a modification of the apparatus described in patent No. 18,992 of 1896.

In the engraving, A is the generator; J K, the gasholder; and C, the water-containing vessel for automatically altering the level of the water in the generator, as required. The base of the moveable carbide holder D, instead of being formed of a "soluble lozenge," is closed by pieces of carbide of suitable forms and dimensions; and the device E—a stationary piston, whose function is to maintain at a constant level, before, during, and after the reaction, the lower part of the mass of carbide—is a metal support or grating.



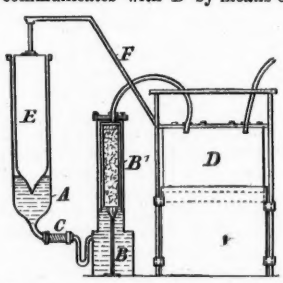
For the purpose of moderating as much as possible, and arresting at the proper time, the hydration of the carbide in the holder D, a receiver or bell F (a sheath) is provided, of any suitable form, but usually corresponding to that of the moveable carbide holder D, which it surrounds. It is attached to the top of the receiver A, and should terminate at its lower end at a short distance above the level of the surface of the stationary piston, grating, or support E. At the commencement of the reaction, a certain amount of gas occupies the interior of F, thereby producing a counter-pressure operating in opposition to the further supply of gas to the sheath, and consequently also to the introduction therein of fresh water carried over by the gas generated. There is also a covering or layer H of oil or other liquid, having a less specific gravity than water, and which extends to some depth over the surface of the water contained in the generator. This layer of liquid forms a seal which is hermetic when the apparatus is at rest, and to a certain extent prevents the water from being carried over during the generation of the gas, without at the same time interfering with the reaction.

I is the pipe connecting the vessel C with the lower part of the generator; and L is the pipe leading from the top of the generator to the gasholder.

Generating and Storing Acetylene.—Chesnay, E., and Pillion, L., of Dijon, France. No. 20,254; Sept. 12, 1896. Date claimed under International Convention, Feb. 25, 1896.

This is another of the series of patents applied for by the above inventors—the previous numbers being 18,992 and 20,090 of 1896.

Referring to the illustration (one of three modifications shown in the present specification), it will be seen that the automatic device described in the former specifications—and which acts as a counterweight to the gasholder, and consists of a receiver containing water and communicating with the gas generator—is modified as follows: A fixed vessel A is connected to the generator B by a pipe C. The vessel (containing a quantity of water) communicates with B by means of a connection so



arranged that, by changing the water-level in the generator, the rate of decomposition of the carbide can be controlled. The variation of level is not effected by the ascent or descent of the automatic device described in patent No. 18,992, but by the ascent or descent—which is made exactly proportionate to the ascent or descent of the bell of the holder D—of a vessel or body E, located in A, and which may be either solid or hollow. This body E is caused to share the movements of the bell D of the holder by means of rods F. The position of the body E is so adjusted that the volume and pressure of the water displaced by the descent of the holder will cause an exactly proportionate action of the water upon the carbide contained in the moveable carbide-holder B^1; the inverse being the case when the holder ascends.

Gas-Retort Settings and Regenerator Furnaces for Same.—Stevenson, G. E., of Manchester. No. 22,887; Oct. 15, 1896.

This invention has reference to the construction of inclined and horizontal gas-retort settings and regenerator furnaces for same.

Heretofore it has been usual, says the patentee, to stop off the producer-arch at the inside of the front and back walls, and to build up the projecting portion of the producer in the front of the retort-setting (and which contains the firing-hole) separate from the arch and internal part of the producer, in which case the projecting portion is "liable to crack and break away, so as to let air in the sides and top of the producer." According to the first part of the invention, the patentee proposes to overcome this defect by building the arch and sides of the producer in such a manner that they are carried through the front and back walls of the retort-setting, and made to project forward of the front wall such a distance as to provide room for the construction of the firing-hole in the crown of the arch of the producer. The firing-holes are formed by preference of specially-shaped fire-clay bricks, which fit in the courses of the arched bricks. But this is not absolutely necessary, so long as "the firing-hole is constructed in the crown of the producer," and "the arch and walls of the producer are carried through the front walls and made to project forward in the front of the retort-setting."

Figs. 1, 2, and 3 are sections of inclined gas-retort settings and regenerative furnaces for same, with the producer-arch constructed in accordance with this invention. The left-hand part of fig. 1 is a vertical section on the line A of figs. 2 and 3; and the right-hand part is a vertical section on the line B. Fig. 2 is a vertical section on the line C of fig. 1; and fig. 3 is a vertical section on the line D.

E is the front wall of the retort-setting; and F is the back wall. G is the gas-producer; and H is the arch of the producer carried by the side walls. These side walls and the arch H are carried through the front wall E (see fig. 3), and made to project forward of same; and the firing-hole I is made in the top part of the producer-arch H, where the latter projects in front of the front wall E. The end wall J of the producer is built separate from the front wall E of the retort-setting—that is, to fill in the end of the arch H between the side walls, and to receive the fire-grate fittings. Thus the part of the arch H containing the firing-hole I and the parts of the side walls which project in front of the front wall E, are not liable to crack and fall away, as they are built as part of the

Fig. 1.

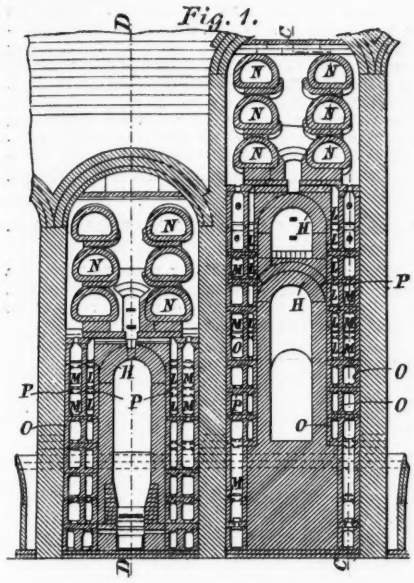


Fig. 2.

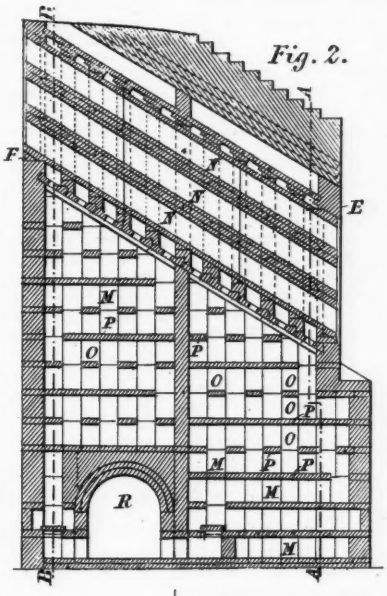


Fig. 3.

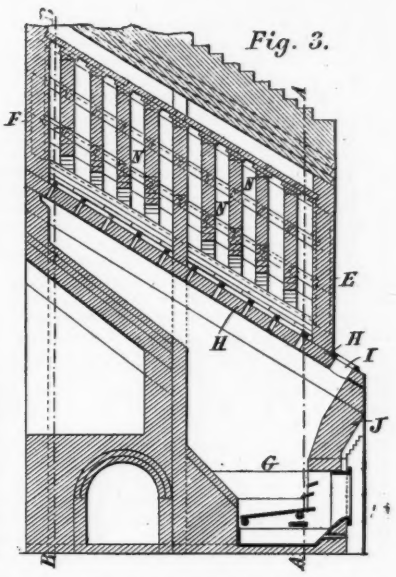
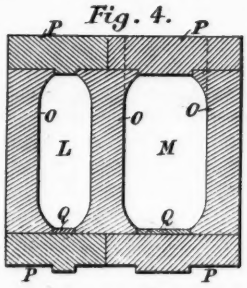


Fig. 4.



other portion of the arch H and side walls, which are contained within the retort-setting.

The second part of the invention has reference to the construction of the regenerator flues of the retort-settings, which are built of specially-shaped fire-clay tiles, to prevent or minimize the leakage of air from the air-flues into the waste-gas flues, and to enable the flues to be more easily put together than when the sides are built of bricks as heretofore.

The retort-setting illustrated by figs. 1, 2, and 3 has the generator flues built of the specially-shaped fire-clay tiles, in accordance with the second part of the invention; fig. 4 being a cross section of one of the gas-flues and one of the air-flues.

The air-flues are marked L; and the waste-gas flues are marked M. In the particular setting illustrated, the gas generated at the producer G passes through the outlet-ports in the producer-arch H, and there meets with the hot air which passes along and up the air-flues L to the air-outlets. Thus the gas burns round the retorts N; and the waste gases pass down and through and along the ports and flues M, thereby heating the walls of the air-flues L, and ultimately pass out through the main waste-gas flue R to the stack.

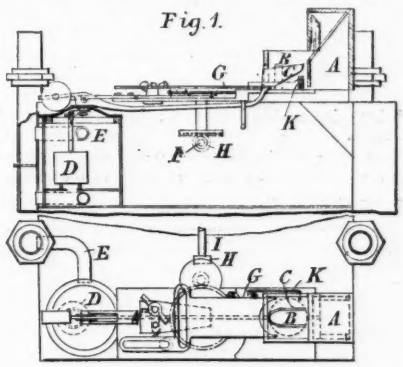
The general arrangement of the air and waste-gas flues forms no part of the invention, but is illustrated so as to more clearly show the construction which forms the second part of the invention, and which the patentee thus describes. "I build the air-flues L and waste-gas flues M of vertical fire-clay slabs O, which are made the full depth of the flue (see fig. 4), and have their sides next the flue or flues curved outwardly at top and bottom in order to provide a wider bearing surface for the joints at the base and with the covering-tiles P than the thickness of the vertical tiles O would admit of if made with straight parallel sides. The covering-tiles P, which are placed horizontally on the vertical tiles O to form the floor and roof of the flues, are made with projecting lugs on the lower side (or on the lower side and upper side), between which the edges of the vertical tiles are confined. When the lugs are made on the lower side of the covering-tiles only (as shown), then the bottom edges of the vertical tiles are held in position by thin fire-clay slabs Q laid between."

The patentee concludes by saying: "It is to be understood that I am well aware that prior to my invention the vertical tiles of the regenerator flues of gas-retort settings have been built with vertical slabs made with their sides curved outwardly at the top and bottom, and that therefore I do not claim these vertical tiles except in combination with the improved covering-tiles which I have described for forming the floor and roof of the flues made with the lugs at one or both sides, between which the vertical tiles fit as described."

Coin-Freed Gas-Meters.—Gamwell, H. & C., and Lind, J. & J., of Liverpool. No. 21,069; Sept. 23, 1896.

This improvement on patent No. 18,448 of 1895 comprises a coin-reception device, a valve for controlling the passage of gas into the meter, a lever for opening the valve (actuated by the coin), a flexible and

Fig. 1.



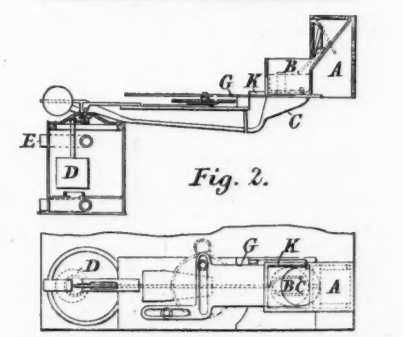
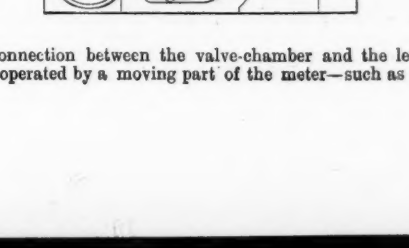


Fig. 2.



gas-tight connection between the valve-chamber and the lever, and a push-piece operated by a moving part of the meter—such as the index

spindle—for removing the coin and releasing the lever when the prescribed volume of gas has passed.

Fig. 1 is a sectional elevation and plan of the upper portion of a meter, provided with the coin-feed mechanism. Fig. 2 is a sectional elevation and plan of the valve-lever weighed down by a coin.

The coin-reception device comprises chambers A and B. A coin of the prescribed size on being introduced falls on inclined guides, along which it is conducted into the chamber B. In passing down the guides, the coin lifts a pivoted catch, and passes under it; the function of this catch being to prevent the withdrawal of a coin after it has entered the chamber B. The coin falls on, and depresses, the forked end C of a lever, whose function is to raise the lift-valve D. If a coin less than the prescribed size is inserted in the slot, it falls between the guides directly into the coin receptacle, without entering the second chamber B; while another object of the two chambers is to prevent tampering with the valve-lever. The valve D is disposed within a chamber covered by a flexible diaphragm; and passing through an aperture in the diaphragm is a screw-threaded portion of the lever. A gas-tight joint is formed by a nut and the shoulder between which the flexible diaphragm is held. To the threaded portion below the diaphragm, is fixed a hook, on which is hung the valve D. The flexibility of the diaphragm (which may be of leather or other suitable material) allows free play to the lever as it oscillates about its fulcrum. Into the chamber B a pipe E is led from the gas-main connection; and from the upper part of the chamber A, a pipe is led back to the gas-main connection, but below the division-plate therein. The valve D, therefore, controls the admission of gas from the main into the meter.

G is a push-piece, having reciprocating motion imparted to it by a crank-pin on a spur-wheel, rotated by any convenient part of the meter, but preferably by a pinion wheel H mounted on the index-spindle I of the meter, through the medium of the crown-wheel and pinion. The function of the push-piece G is to push the coin which weighs down the lever off the forked end C thereof, and into the coin-receptacle, and also to hold down the lever until the spur-wheel below has completed a revolution. The forward end of the push-piece G is semicircularly hollowed to correspond with the form of coin used; the object of this being to ensure contact with two or more points on the edge of the coin, for if the end were straight it might insert itself under a bent coin.

The mechanism being in the position shown in fig. 1, when a coin is inserted it falls on the end of the lever, and depresses it; the valve D is raised; and this allows gas to pass from the main into the meter. The index-spindle I then rotates the spur-wheel below, and its pin moves forward the push-piece G so that it pushes the coin off the end C of the lever, and takes the position shown in fig. 2. The coin having been displaced, the plate G prevents the lever from rising until the spur-wheel has made a complete revolution and withdrawn the plate from contact with the lever, which then rises and closes the valve D.

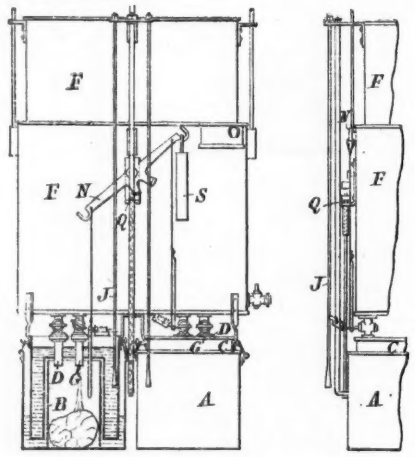
The part of the lever which is last in contact with the plate G is inclined as shown, so that the rise of the lever (as the plate passes from it) is gradual, and the valve D is slowly closed. In order to provide for the gradual lowering of the gas-light, and its final extinguishment, the incline is formed with a notch at its lower part.

The end of a spring K projects into the chamber B of the coin-reception device. The lower part of the spring is recessed, to allow the passage of one coin only; while its upper part, and the plate shown, retain coins stored above the coin. If the coin to be passed happens to be bent, the spring gives way, either laterally or vertically, to allow it to pass. A glazed aperture is provided in the side of the chamber B, so that the number of coins in the chamber can be seen. Entering by the slot, a coin turns over in its fall through the chambers A and B; and when the chamber B is full of coins, the next coin inserted lies in the passage between the two chambers. The following coin rests upon the edge of this coin, and blocks the slot (as shown by dotted lines in fig. 2) until the pile of coins is sufficiently lowered.

The quantity of gas passed as the equivalent of a coin inserted may be varied by the use of change-wheels connecting the push-piece G with the moving part of the meter.

Generating Acetylene.—Mackenzie, W. J., of Glasgow. No. 23,752; Oct. 26, 1896.

The accompanying illustration shows a front elevation and a part side elevation of the apparatus fitted with two carbide containers, according to this invention.

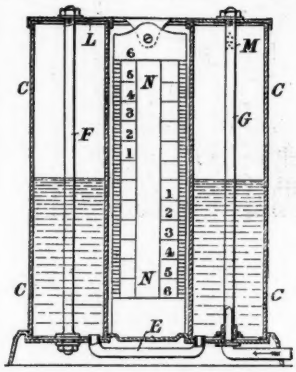


Each generator consists of a water-tank A, in the middle of which is the case B containing the carbide. Over the case B is fitted a double-cased vessel C, whose lower end dips into the water-tank A, and forms a trap between it and the carbide container. The bell C is filled with water to absorb the heat generated in the formation of the gas. From the interior of C, a pipe D is led into a holder F; and from the water-tank of the holder, a pipe G leads into the casing charged with carbide. The water-pipe is fitted with a regulating-cock having a lever-handle, operated by a rod J from the rising and falling holder. On the rod is a brake, composed of a jointed or spring arm, adjusted so that it engages the rod during the early part of the upward movement of the latter with the holder, but releases it and permits of the free rising of the holder without entirely closing the regulating-cock when the holder has reached a certain height, because of the lever-handle being then in such a position that its friction upon the rod J is not sufficient to cause it to be further lifted.

In order to make the supply of acetylene continuous, a device is provided by which one of the water-supply cocks is held in a closed position, while the other is free to be acted upon by the rising and falling of the holder. This device consists of a beam-lever N, pivoted on the holder, and having attached to it near either end a chain or looped wire. These loop wires act alternately upon the lever-handles of the supply-cocks, to hold one of them closed when the other is generating the gas. This is effected by a rod Q on the holder acting upon one of two projections on the lever N, to keep one end of the lever raised as indicated. When the holder has fallen below a predetermined height, the rod clears the projections; and the raised and weighted end of the lever N falls. The lever handle, which was formerly raised, is thereupon allowed to drop; and its supply-cock is opened to admit water to the generator, at the same time as the cock on the other generator is closed. The weight S may be removed, now or later, to the other end of the lever, in order that the supply-cock of the generator which is in action may be closed the instant the generation of gas therein has ceased, and the other cock opened to supply water to the idle generator, which would in the meantime have been recharged with carbide.

Pressure-Gauges.—Glover, R. T. & J. G., of St. John Street, Clerkenwell. No. 24,441; Nov. 2, 1896.

The object of this invention is "to construct a pressure-gauge in a more economical manner, and of more convenient form and materials, than has hitherto been the case; moreover the readings are more apparent, by reason of the greater bulk of water employed."



The patentees propose the employment of two ordinary gas-burner or lamp chimney glasses C, communicating by a pipe E, for the free flow of water and the indication of gas pressure upon a scale N. E is a connecting-pipe or bridge between the glasses, in one of which is screwed a solid rod F, and in the other a tube G in connection with the inlet-pipe. The opposite ends of the rod F and tube G stand slightly beyond the tops of the glasses, and are screwed to receive nuts, which serve to clamp a cap with indiarubber packing, so that it is hermetically sealed; while the other is open to the atmosphere through a hole L in the cap. The gas, as it enters, is caused to rise up the central tube G (which is closed at its top end), and overflow through holes M into the hermetically sealed glass above the water, thereby exerting pressure upon the water, and causing it to proportionately rise in the other tube.

Gas Heating and Drying Stove.—Zschetzschingck, H., of Leipzig. No. 24,539; Nov. 3, 1896.

This oven preferably consists of a rectangular chamber constructed of stone, fire-clay, or other suitable material, in the bottom plate or between the bottom plates of which is formed a longitudinal slit or passage, for the entry of fresh air. Over the bottom plate is arranged a plate bent upwards at its ends. Pipes placed longitudinally relatively to the oven, and having their outlet-openings turned towards each other, serve to supply the gas; and above these pipes strips or ledges separate the pipes from the heating or drying space. Beneath the cover of the oven is a partition; and behind the door (or doors) through which the objects to be heated in the oven are introduced, is a second partition, so that an inner closed drying or heating space is formed not in direct connection with the chimney. This space is surrounded by an air-jacket formed by the partition, through which the products of combustion will pass to the chimney. Beneath the second partition, behind the doors, a slit or opening is left, through which the gases from the drying or heating space escape to the chimney. When the oven is in use, the gas-flame issuing horizontally from the openings in the gas-pipes first warms the plate lying above the air-inlet passage. The fresh air entering through the passage is heated by this plate, and thus mingles in a highly-heated condition with the gas, whereby "perfect combustion is obtained, which can be ascertained from the whiteness of the flame produced." The products of combustion rise in the heating or drying space (imparting a uniform temperature thereto); and then escape through the opening beneath the partition, behind the doors into the air-jacket, and thence to the chimney.

Igniter for Gas Motor Engines.—Lanchester, F. W., of Alvechurch. No. 24,805; Nov. 5, 1896.

This invention refers more particularly to igniters in which an electric

spark is employed; the object being to dispense with the usual battery, and to provide a magneto-electric generator without adding to the weight of the machine.

Gas-Lamp Chimneys.—Kray, M., of Berlin. No. 24,991; Nov. 7, 1896.

The claim advanced for this invention is for "a lamp chimney, made of glass, and more especially intended for incandescent gas-lights; its characteristic feature consisting in the arrangement of fields or sections upon its outer surface, each presenting preferably a square-shaped base, and forming an outwardly projecting pyramid, upon the base—the object of this arrangement being to disperse the beams of light, and to increase the illuminating effect of the lamp."

Holders for Acetylene and other Lighting Gases.—Jimeno, E., of Barcelona. No. 14,091; June 9, 1897.

The inventor claims an "improved gasholder" without liquid, but with bellows (for acetylene or other lighting gases), formed by a vessel or receiver of any material impermeable for gas, containing bellows arranged in such a manner that, when expanding or contracting, they leave room for the gas in the holder; and conversely, when contracting or expanding, they take the place of the gas. The dimensions, forms, and materials of the bellows and of the holder are variable at pleasure; and the regulation of the pressure is made, by means of gravity, by a conveniently arranged weight.

APPLICATIONS FOR LETTERS PATENT.

21,508.—Pictet, R. P., "Production of carbide of calcium." Sept. 20.
21,539.—Junge, C., and Norman, E., "Gas and like engines." Sept. 20.
21,588.—Hay, W. G., "Internal combustion engines." Sept. 21.
21,602.—Cannell-Bunn, P., "Mantles for gas and other burners." Sept. 21.
21,608.—Walker, H., "Manufacture of calcium carbide." Sept. 21.
21,665.—Ball, F. L., "Apparatus in connection with the manufacture of gases." Sept. 22.
21,681.—M'Conechy, J., "Production of acetylene gas." Sept. 22.
21,790.—Bishop, H. S., and Salmon, C., "Bunsen burners for lighting purposes." Sept. 23.
21,799.—Maxim, H., "Manufacturing and utilizing gas, &c." Sept. 23.
21,809.—Hart, G. W., "Internal combustion engines." Sept. 23.
21,831.—Lake, H. H., "Production of acetylene gas, and lamps for generating and burning the same." A communication from the Wizard Manufacturing Company. Sept. 23.
21,833.—Scott, F. S. D., and Hawkins, T., "Generation of gas for motive power, illuminating, heating, and other purposes." Sept. 23.
21,838.—Robey, A. W., "Anti-vibration appliance for use with incandescent gas-burners." Sept. 23.
21,865.—Player, J. H., "Automatic gas-tap." Sept. 24.
21,889.—Hacking, J., Whalley, D., and The Ideal Gas Company, Ltd., "Burner applicable for acetylene gas." Sept. 24.
21,891.—Macallum, P. F., "Internal combustion engines." Sept. 24.
21,935.—Killing, C., "Automatic igniting devices for gas-burners or incandescent gas-lamps." Sept. 24.
21,953.—Ennis, T. F., and Green, F. S., "Safety locking appliances for water-gas apparatus and the like." Sept. 25.
21,970.—The British Acetylene Gas Generator Company, Ltd., and Spence, H. K., "Acetylene gas-lamps." Sept. 25.
21,989.—Cliff, W. D., and The Leeds Fire-Clay Company, Ltd., "Inclined retorts." Sept. 25.
22,065.—Dymond, J., "Gas-burners." Sept. 25.
22,066.—Dymond, J., "Gas-producers." Sept. 25.
22,083.—Madderson, T., "Water-meter." Sept. 27.
22,170.—Inglefield, W. G., "Lighting of passages, corridors, and other places." Sept. 28.
22,190.—Russell, T. G., "Explosion engines." Sept. 28.
22,239.—Billen, R. L. M. P., "Lighting arrangements for gas-lamps." Sept. 28.
22,319.—Perl, J., "Automatic gas-igniters." Sept. 29.
22,327.—Gomess, A. F. B., "Mantles for incandescent gas lighting." Sept. 29.
22,350.—Türr, R., "Acetylene lamps." Sept. 29.
22,402.—Read, W. E., "Gas firelighter and cooking-stove." Sept. 30.
22,472.—Pitt, S., "Liquid meters applicable in some cases as motors." A communication from L. Burrell. Sept. 30.
22,518.—Hislop, G. R., "Gas-producers." Oct. 1.
22,561.—Hall, J. P., "Gas-engines." Oct. 1.
22,564.—Fistié, E., "Gas-engines." Oct 1.
22,625.—Voelker, W. L., "Manufacturing incandescible materials." Oct. 2.
22,626.—Voelker, W. L, "Improvements in incandescible materials and mantles, and the process of making the same." Oct. 2.
22,648.—Ageron, J. A., and Wirth, L. P., "Generation and combustion of acetylene gas." Oct. 2.

Filey Water and Gas Works Purchase Question.—A meeting of property owners and ratepayers of Filey was held last Friday, to determine whether a Bill should be promoted in the next session of Parliament by the District Council for the compulsory purchase of the Filey Water and Gas Company's works. The Company informed the Council a short time since that they had no desire to sell their undertaking. At a subsequent meeting of the Council, the members passed a resolution unanimously approving of the works being purchased; and accordingly the meeting of ratepayers was convened. Mr. Maley, the Chairman of the Council, presided; and he expressed the opinion that the present was the most suitable time to purchase the undertaking. Money was, no doubt, as cheap as it ever would be. He took it that it was the desire of the town to give the Company a fair price. Mr. Hinchliffe moved that a Bill be promoted for the compulsory purchase of the works; and Mr. Cogill seconded the motion. Two or three speeches were delivered in opposition; but the meeting favoured the proposal. It was understood that a poll would be taken.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Scope of the Workmen's Compensation Act, 1897.

Sir,—Up to the present time, I have not seen any statement in the "Journal" as to whether or not the above-named Act applies to gas-works. Obviously, the question is one of very great importance, and one that ought to be promptly cleared up. Section 7 of the Act says it shall apply to a "railway, factory, mine, quarry, or engineering work," and to employment on the erection of certain new buildings, or the repair or demolition of certain other buildings therein defined. Now, I take it that if a gas-works is brought in at all, it must be as a factory; and then the question arises: What does the Act mean by "factory"? The answer is that it "has the same meaning as in the Factory and Workshops Acts, 1878 to 1891, and also includes any dock, wharf, quay, warehouse, machinery, or plant, to which any provision of the Factory Acts is applied by the Factory and Workshops Act, 1895, and every laundry worked by steam, water, or other mechanical power." Then these Acts define to what premises and works they apply; but still no mention is made of a gas-works. I say with considerable diffidence that I do not think the Act does apply to gas-works. If I am wrong in my view, I trust some of your correspondents will speedily put me right.

Robert Hall.

Matlock, Oct. 8, 1897.

LEGAL INTELLIGENCE.

WESTMINSTER COUNTY COURT.—Thursday, Oct. 7.

(*Before Mr.* Lumley Smith, Q.C.)

The Gaslight and Coke Company v. Mann.—Another Question of Meter Registration.

This was a case in which the plaintiffs sued Mr. Edward Mann, an electrical engineer of 3, Cecil Grove, W., for £15; being for 95,000 cubic feet of gas alleged to have been consumed by the defendant in the quarter ending March, 1897. Defendant denied that he had burnt so much gas; and he paid £5 0s. 8d. into Court—this being similar, within a few pence, to the amount of the gas bill for the previous quarter.

For the plaintiffs, it was contended that the meter was *primâ facie* evidence, and that as it had recorded the amount sued for, and had been tested and found to be correct, the defendant was bound by it. An employee of the Company who examined the meter said it recorded a consumption of about three times as much gas as in the corresponding quarter of the previous year; and this being so, he thought it best not to put the amount on the card. He therefore brought down the figures entered for the preceding quarter. In his book, however, he registered the full amount recorded upon the index as having been consumed; and the meter was afterwards tested, and found to be correct. Other evidence was called to show that the defendant had five gas-stoves in his house; and assuming that these had all been going, the quantity of gas registered might have been consumed. An inspector of gas-meters in the service of the London County Council said he tested the meter and found it to be correct.

For the defence, it was submitted that the meter, through some unknown cause, stopped for the whole of the quarter, and that this was why the man who came to take the registration entered the same figures as in the previous three months. The gas-stoves had been thoroughly tested; and it had been found that they would all have to be burning at full pressure for 17 hours a day during the whole quarter in order to consume the quantity of gas charged for.

Mr. *H. T. Rutter*, Assoc.M.Inst.C.E., said he had had about ten years' experience in connection with gas-meters, and was thoroughly acquainted with the details of their action. He had known several cases where meters had stopped. He had tested the five stoves, and found that when they were full on they consumed 64 cubic feet of gas an hour; and at this rate they would have to be alight for 17 hours a day to consume 95,000 cubic feet in a quarter.

Cross-examined: He had never known a meter to stop unless it had first been taken down to have something done to it. Having stopped, a blow or a shaking might cause it to go on again. He tested the stoves in the daytime, when the pressure would not be so great as at night time; but it would not make any difference with good burners as the lights were full on, and besides it was in the daytime when the stoves were usually going. They were small stoves, used for heating the rooms. He noticed the large stove fixed by the Company; but he could not say whether its capacity was 25 cubic feet an hour. He tested all the stoves together; and the aggregate was 64 cubic feet an hour.

The defendant was called, and stated that when the gas inspector came he said he could not send in the March quarter form because the consumption was so great that it would have to be verified. Witness told him it ought not to be so, as he had certainly not burnt more gas than in the previous quarter. One of the stoves—that in the servants' bedroom—was scarcely ever lighted. As a fact, the stoves were not often alight long at a time.

Mrs. *Mann* was also called, and gave details as to the time when the stoves were kept alight. It was, she added, impossible to have consumed half as much gas as was charged for. The amount would be about the same as the previous quarter, for which the gas bill was only £5 1s.

His Honour gave it as his opinion that the quantity of gas charged for was more than could have been consumed; but he said it seemed that the March quarter was usually rather heavier than the Christmas quarter; and therefore he should give judgment for the plaintiffs for £2 beyond the sum paid into Court. There would be no order as to costs.

Thefts from Prepayment Gas-Meters.

At the Lambeth Police Court last Tuesday, Henry Pagett, described as an insurance agent, of Landcroft Road, East Dulwich, was charged

before Mr. Hopkins with breaking and entering No. 56, Landcroft Road, and stealing therein 6s. 5d., the moneys of the South Metropolitan Gas Company. Detective-sergeant Knell stated that about half-past six o'clock on the previous Monday night he was in the above-named road, in company with Detective Gordon. They there saw the prisoner, whom they had suspected for some time of abstracting money from automatic prepayment gas-meters. Witness and Gordon went to No. 56—a house which had just been vacated—and secreted themselves. About half-past seven, the prisoner came to the door and knocked; and, getting no answer, he opened the door with a key. Witness heard him go to the gas-meter, and there was a noise as though it was being broken open, followed by the chinking of money. Prisoner then went upstairs; but, after remaining there a few minutes, he came down again into the passage. Gordon and witness thereupon seized him. He resisted violently; but he was eventually got into the street, and taken to the station. On the way he made three attempts to escape. William Knapp, the Company's inquiry officer, said he examined the meter, and found that the lock had been forced and the contents of the money-box abstracted. The detective-sergeant mentioned that there had been upwards of a hundred cases of robberies from these meters; and he asked for a remand. The request was granted.

MISCELLANEOUS NEWS.

COMMERCIAL GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Thursday, at the Cannon Street Hotel, E.C.—Mr. J. Blacket Gill in the chair.

The Secretary (Mr. H. D. Ellis) having read the notice convening the meeting, the Directors' report and the accounts—the principal portions of which were published in last week's issue—were presented.

The Chairman, in moving the adoption of the report and accounts, said the Directors were very pleased to meet the proprietors on this occasion, more especially as in one respect their accounts were eminently satisfactory. He alluded to the large increase in the consumption of gas. When he told them that the large Company which surrounded their district on every side showed an increase of 7 per cent., and the South Metropolitan Gas Company, with their splendid area, 10 per cent., he thought they must congratulate themselves in having obtained, in what they had always considered the poorest district in London, an increase of no less than 11 per cent. Had residuals been kind to them, they would certainly have had a record half year. But residuals were still somewhat of a drug in the market, though he was glad to say, from reports he had received, there seemed a chance of something better in this direction. During the six months, they had paid for coal £7423 more than in the corresponding period of last year; but an additional £15,315 had been received for gas sold. Residuals were less by £783; but it was necessary to go back two years to fairly judge this decrease, because two years ago, the residuals showed a gain above the present figures of between £9000 and £10,000. This was where the loss really occurred. The rental of meters was £1000 more. The coin meter business was still going on very satisfactorily; and they had now 6670 in the district. The result was they had earned £3978 more, which made the balance to be carried to the net revenue account £47,227. Inasmuch as they desired to pay 13½ per cent. on the old stock, 10½ per cent. on the new stock, place ¼ per cent. to the reserve, and pay £3712 for interest on debentures, and £303 for balance of interest on loan, they would require £50,695. As the profit was £47,227, they were £3468 short. This it was proposed to take from the reserve of undivided profits, which now amounted to only £5032; and they would then have £1564 to carry forward. It went a good deal against the grain in a half year like this that they should be compelled to take money from the undivided profits. Fortunately, as the proprietors were all aware, they had more than £40,000 in the reserve fund which was not touched. The undivided profits had stood them in good stead before for many years past; and he was sorry they were becoming "small by degrees, and beautifully less." It only seemed reasonable that, if they had reserves, they should be utilized on an occasion like the present to make up the dividend to which they were entitled. Those proprietors who had bought stock at a high premium would probably feel somewhat aggrieved if they did not get the usual dividend. Therefore he supposed they would all agree that the same rates should be paid as before. Some of the proprietors might naturally say: "But you have raised a considerable amount of capital since we last met. How are you going to pay the dividend on that, which will take more than the present half year?" He was not going to prophesy anything; but he thought there was every chance they would effect considerable savings during next half year. In the first place, they had employed some of the new capital in building oil-gas plant at the Poplar works; and the Directors believed this would be of great advantage to the Company. Wherever similar plant had been working, it had been a great success; and they had every hope and belief that this plant would save a large sum of money in the course of the next six months. Then, again, they were erecting some alkali works. Some gentlemen with very sensitive noses had found out that gas-works were sometimes unpleasant neighbours; but he did not suppose they were gas proprietors. (Laughter.) The Company intended to get rid of everything unpleasant; and at the alkali works they were going to make sulphuric acid. The Company were large dealers in this product; and he hoped they would gain a considerable sum in that direction. Then, as the business increased, they were employing labour-saving machinery, by means of which two or three men could do the work of several; so that they hoped to show a saving in that way. Under these circumstances, he trusted that in six months' time they would find they were able to make both ends meet. A great deal depended upon coal, the price of residuals, and so on, though, of course, these were things over which the Directors had no control. In regard to coal, he ought to mention that, under their present contracts, they were provided for to next summer. The Engineer (Mr. H. E. Jones) had had some difficulty in getting his new works in order—indeed, they were not quite ready yet. They had hoped to have had them completed by the beginning of October, because the next three months were those in which they looked to make a good harvest. But the unfortunate dispute between the masters and men in the engineering trade had somewhat retarded the progress of the work. He thought this was a dispute that every thoughtful man must deeply regret. Sometimes it struck him that, if their old country was to lose its place in the scale of nations, it would certainly not be from the enemies without, but from the action of their own sons at home. *Quem deus vult perdere, prius dementat.* And really it did appear to him that these men must be blind both to their own success and the good fortune of their country. At all events, this strike did interfere with the Company's work; but they hoped to get the work finished in a few weeks. At the meeting of the South Metropolitan Company a few weeks ago, their friend Mr. Livesey spoke of the question of rates; and the proprietors were all aware how heavily they pressed upon their own and other companies. Mr. Livesey pointed out how unfairly gas companies were assessed—the mode of assessment was not fair; but he (the Chairman) only mentioned it to say that, if anything could be done—and, if anything could be done, Mr. Livesey was the man to do it—the Commercial Company would support him in any way they could, in order to get some relief from this burden. At the meeting of the South Metropolitan Company, another point was raised by their own Engineer. It was a matter in which he (the Chairman) was much interested, and to which he had alluded before at previous meetings—that was, the illuminating power of gas. If they wanted to get any reform, they must keep pegging away at it. He was a great enemy to anything like waste; and it did appear to him that, in this nineteenth century, it was a foolish thing that they should be compelled to provide such a high illuminating power. It was absolutely and grotesquely absurd that they should have to supply gas of such high quality for the humblest purposes of domestic life; and if the consumers (who had been well called the "sleeping partners" in gas companies) would only wake up to the fact that, if a reduction of, say, 1 candle was made, it would mean a saving of many thousand pounds, the Company would gladly put it into the consumers' pockets, by reducing the price of gas. He was certain that, if they only understood this, it would give the Company some relief. The Directors were all of the same mind as to cheapness; and if they could reduce the price of gas, and get some relief in this way, it would put the Company on a more secure foundation than anything else. With regard to the new stock which had been allotted, the Secretary had drawn up a most lucid statement; and he (the Chairman) should have thought that everybody would certainly have understood it. However, some proprietors—probably resident abroad—did not take up their allotments; and something like 10 per cent. of the new stock and 10 per cent. of the debenture stock were unallotted. Under the resolution authorizing the issue, they were compelled to dispose of this, for the benefit of the Company, at the best price they could get; and so the Directors had determined to sell the balance of the stock, on Dec. 6 next, at the Auction Mart. He was sorry that those proprietors who had not taken up the stock should lose it; but he could honestly tell them that, for the sake of the Company, he was glad, because it would gladden the heart of their Engineer to give him a little premium capital to enable him to work somewhat better against his neighbours, who obtained their capital on much easier terms than they did. Everything was going on satisfactorily; and he could only conclude by congratulating those present on being proprietors in a Company which was as sound as it was possible for a Company to be.

The Deputy-Chairman (Mr. W. G. Bradshaw) seconded the motion, which was unanimously carried.

Dividends at the rate of 13½ per cent. per annum on the old stock, and 10½ per cent. per annum on the new stock, less income-tax, having been declared,

A hearty vote of thanks for their services was passed to the Chairman and Directors, on the motion of Mr. Ennis, seconded by Mr. Cecil.

The Chairman, in a few words, acknowledged the compliment, and then moved a similar vote to the Engineer, Secretary, Accountant, Sub-Engineers, and all engaged in the work of the Company. He remarked that the new works had given them a good many troubles to contend with; and Mr. Jones had had a very anxious time during the past twelve months. As the proprietors knew, their Engineer was not easily daunted by difficulties; and he (the Chairman) was glad to say Mr. Jones had overcome all his troubles in that respect.

Mr. George Livesey, in seconding the motion, remarked that he had himself been an officer of a Gas Company for many years; and he felt that the officers of the Commercial Company thoroughly deserved this recognition of their services.

The motion was heartily adopted.

Mr. Jones, in reply, observed that all the officers and staff, from the highest to the lowest, appreciated this vote. Regarding the Chairman's kind remarks, he must say that there had been no particular worry falling upon him, nor had there been any great obstruction to their works by the engineering strike, except an indirect one—that was to say, the manufacturers who were making large pieces of their machinery had had their men locked out, and so could not send the machinery forward. That was the explanation. They could not complete the works, and realize the benefits of the more modern plant, because parts of it could not be delivered owing to this unfortunate dispute between the masters and men. With reference to the new alkali works, the Chairman had, without knowing it, given him a side kick. There was no smell about the works in any way. When the new sulphuric acid works (which were costing them £5000, and would make them more money) were finished, he was mortally afraid there would be a nuisance, though there was not one yet. The sanitary officers had never found any trace of an escape of noxious gas from their works. The Company had been forced to this outlay by the officers of the Local Government Board; but he would not say more about it because they had taken action against the Company, which was for the moment in suspense. Respecting the 11 per cent. increase in the consumption, this was very encouraging to him, because he had began to think that the poor East-end of London was going to the bad altogether. But, as everyone knew who was acquainted with the district, there was a great and pleasing change going on. Most of the dirty old rookeries had been cleared away, and had been replaced by some nice high-storied dwellings. Although the dock business was leaving the East of London, there had been a revival of trade, which would

help the Company considerably. While he would not ask the proprietors to believe the 11 per cent. increase would continue, or anything like it, he must say there was room for good, steady growth, especially if they went on supplying gas to the dwellings of working men as they were now doing. They had discovered this little fact—that they were not only helping the working men, but the working woman too, because where the latter could get her husband to put in a small gas-stove the consumption in that house went up more than 50 per cent. They had not had a single complaint in regard to the fittings on the prepayment system, nor had they had any returned; on the contrary, they found they were a great comfort to their working class consumers.

Mr. ELLIS also replied; and the proceedings then terminated.

UNIONISM AT THE ROTHERHAM CORPORATION GAS-WORKS.

A Strike Threatened.

In the "JOURNAL" last week, it was reported that the National Amalgamated Union of Labour, through their District Secretary (Mr. Bailey), had written to the Manager of the Rotherham Corporation Gas-Works, saying that the Union men employed at the works would decline, on and after the 6th inst., to work with the non-Union men engaged there unless they joined the Union, and that the Manager had, in pursuance of the instructions of the Chairman of the Gas Committee (Mr. G. Gummer), written that any person employed at the gas-works was at liberty to exercise his own judgment as to whether he joined the Union or not, but that, so long as he did his duty at the works, he would be found employment. The Committee unanimously recommended to the Council that the views expressed in this letter should be confirmed and acted upon; and last Wednesday, after a very brief discussion, the Council adopted this recommendation, apparently unanimously, there being no vote taken to the contrary. Some interviews had taken place between Mr. Bailey, acting on behalf of the men, and the Corporation officials; and it was expected that the matter would be allowed to rest, and that extreme measures would not be resorted to on the part of the Union men. On Thursday, however, there was a fresh development of the matter. It was the intention of the workmen as stated in their letter, to cease work; but it was pointed out to them that this would be illegal. The contention of the Union men was that the letter sent by Mr. Bailey to the Gas Manager a fortnight ago was really a collective notice. The opinion of the Town Clerk (Mr. H. H. Hickmott) was taken; and this was found not to be the case—the Union men accepting his decision on the point. It was understood later that the men had decided to hand in fourteen days' notices of their determination to leave their employment; but news has not yet reached us as to whether the notices have been delivered.

LEEDS CORPORATION GAS SUPPLY.

The Supervision of the Distribution Department and the Recent Gas Suffocation Case.

According to a discussion which took place in the Leeds City Council last Wednesday, the Gas Committee have for some time past been dissatisfied with the general working of the mains inspection department, of which Mr. Suddaby is the chief; and the minutes they presented on Wednesday contained a recommendation of a Sub-Committee that that officer's services should be dispensed with. This led to a somewhat vigorous discussion, which was opened by Mr. France moving that the recommendation should be referred back. He submitted that the step to dispense with Mr. Suddaby's services had been decided upon in consequence of his failure to report as quickly as he ought to have done the unfortunate accident by which two ladies had lost their lives (see *ante*, p. 641). Through an error of judgment, Mr. Suddaby had not at once reported the sad affair to the Chairman of his Committee (Alderman Walker), and the Manager of the Gas Department. He had been 23 years in the service of the Corporation, and ought not to have been treated in the way suggested, especially as he was in no way to blame, as he was, as a matter of fact, on his holidays at the time. The punishment was altogether out of proportion to the crime. Mr. Henry, seconding the amendment, also appealed for more merciful treatment being meted out to Mr. Suddaby. The same view was taken by Mr. Batley. Mr. H. Scholefield, on the other hand, supported the adoption of the minutes; contending that the unfortunate case of gas suffocation that had been referred to had not so much to do with the matter as was suggested. There had been dissatisfaction with Mr. Suddaby's department for some time; and his dismissal was under the consideration of the Committee about a year ago. On that occasion, Alderman Walker appealed for another chance for Mr. Suddaby. That trial had been given; and now Alderman Walker favoured the motion that Mr. Suddaby's services should be dispensed with. Alderman Scarr was of opinion that, if Mr. Suddaby was away on his holidays, it was the duty of Alderman Walker and his Committee to have seen that someone was appointed to attend to the work in his absence. Alderman Walker explained that no one had been deputed to do the work because Mr. Suddaby was unwilling to have anyone appointed in his place, as he would, he said, be able to visit his department from day to day. Alderman Walker proceeded to refer to certain irregularities which he said had prevailed in the department for some time past. Mr. H. Brown supported the Committee—denying that there was a particle of vindictiveness in their action. If Mr. Suddaby had a holiday, why, he asked, did he not avail himself of it? Mr. Connellan deprecated the proposed dismissal without Mr. Suddaby having an opportunity of submitting his case to the Committee. Mr. C. H. Wilson, while of opinion that Mr. Suddaby was a respectable, hard-working man, said he thought he was not able to maintain the discipline of a great department. He might be very suitable for one position; but he was altogether unsuitable for the position which he at present occupied. The difficulty might be got over by offering another post to Mr. Suddaby, if the latter did not make it too warm for anyone who might be placed over him. He believed it was the intention of the Gas Committee to take some such step. Mr. Lowden, speaking in support of the action of the Committee, reminded the Council of the great responsibility that rested upon them if they allowed themselves to be made a kind of Court of Appeal from Committees who had the charge of the great Corporation undertakings. The difficulty of the management of gas-works, as the members were aware, was very great; and if the Council were to be considered a Court of Appeal on every matter, the authority of the Gas Committee would be very much weakened. With regard to the question under consideration, the whole of the Committee, with two exceptions, were in favour of the motion proposed. As to the charge that Mr. Suddaby had been overburdened with work, it was to be remembered that an assistant had been given to him; and that, for some cause or other, Mr. Suddaby had ignored him, and had not taken the advantage of the assistant's services in the way he ought to have done. The gas suffocation case that had been made so much of, was by no means the sole ground of the Committee's decision. The matter was essentially one in which the Council ought to be guided by the Committee. They had found such a reckless state of things existing at the Dewsbury Road department that workmen seemed to leave work when they liked, and charge what they chose. In their great work of improving the organization of the gas undertaking, the Committee had been generally supported by the Council; and he trusted they would not weaken the authority of the Committee by deciding to refer the question back for further consideration. The minutes were confirmed by 38 votes to 19.

THE ASSESSMENT OF THE TORQUAY GAS COMPANY.

In the short notice of the proceedings at the last half-yearly meeting of the Torquay Gas Company which appeared a fortnight ago, it was stated that the Chairman (Mr. W. H. Kitson), in the course of his remarks, referred to the result of the Company's appeal against the re-assessment of their property. We have since received a full report of the proceedings at the meeting, and reproduce the portion bearing upon this matter, as illustrating the needless trouble the Company were put to in connection with it. Mr. Kitson informed the shareholders that the dispute with the Assessment Committee had been going on for a period of eighteen months, if not two years. The assessments were raised from £3000 to £3500 gross, and from £2400 to £2800 net rateable value. This was for the portion of the undertaking in Torquay only. The authorities were advised not to persist in so great an increase; the original rating being, in the Directors' opinion, too high. The Company appealed, and called in professional advice at great cost. The Union authorities did likewise, at the cost of the ratepayers. The result was that, in the first place, the net rating was reduced to £1920, as against £2800; and on their second appeal it was lowered to £1750, as against £1920—a total reduction of £1050. While the matter was under discussion, the Company were most improperly summoned for non-payment of rates early in April of the present year; and further annoyance and expense were put upon them, and the money was paid under protest. The amount of rateable value was finally ascertained on the 20th of June; and on the 26th of that month, the Clerk to the Guardians wrote to the Overseers giving them notice of what had taken place. Nearly three months passed, and the Company's money not having been returned, he (Mr. Kitson) wrote on the 15th of September to the Clerk to the Guardians and received from him a reply, dated the same day, in which he said he had written to the Overseers of Tormoham on the 26th of June, notifying to them the reduction in the rateable value of the Company's works in Tormoham to £1750, and he was writing to the Assistant-Overseer that day giving him a copy of the letter. It was only the previous day that the Company received re-payment from the Overseers of the Poor, and only about a week before that a cheque was received from the Corporation for the general district rate, dated July 23, and kept back for some mysterious reason which they did not know, none being given for the delay, and no apology offered for the trouble and annoyance caused. The saving effected to the Company by the appeal would probably be £200 per annum; and he thought it would have been better for the ratepayers of Tormoham if they had left well alone. What was the moral to be drawn from such a vexatious and foolish business? It was that it was often better to leave well alone; and that paid officials of the public should be careful how they took advantage of the little authority their public position might happen to give them. The question of gas rating was an intricate and difficult one, which none but those perfectly conversant with it could be expected to understand thoroughly; and officials of gas companies might at least be supposed to know as much about it as overseers and assistant-overseers. Their officials—and he was speaking to them as Torquay ratepayers on a matter of considerable interest to them and their pockets—would have shown more wisdom and judgment had they listened to the reasonable representations from the Company, and not have wanted to put up the assessment. What had these town officials gained? Nothing. But the loss to the town on the Company's assessment totalled up to £650; the figure at which it stood when the agitation commenced not only not having been increased to the Company's detriment, but actually reduced by that sum. He had spoken rather fully on the matter, because it was only right that the shareholders and the public should know the facts. He felt strongly upon it, and especially as they, as a respectable Company of long and good standing, had been summoned before the Bench for non-payment of rates at a time when the questions in dispute were not settled. It was an indignity offered to them and their officers to which they should not have been subjected.

Gas Workers and the Engineers' Strike.—The engineers' strike is affecting the Gas Workers' and General Labourers' Union in a marked degree; and one of the results of this is the presentation of petitions to local authorities, pointing out the serious condition into which the engineering dispute is bringing unskilled labourers, and calling upon local authorities to find some useful and remunerative employment for all the men affected. The undertaking of local improvements and works at what may be regarded as a very favourable opportunity for such a purpose is suggested.

SOME PROJECTED COMPANIES.

The "Pall Mall Gazette"—which is rapidly acquiring quite a reputation in the City for its financial notices—had last week some ugly remarks to make about two joint-stock concerns likely soon to be launched on the public, and in which readers of the "JOURNAL" might under other circumstances have had some special interest.

On Thursday the following paragraph appeared with the title "Gas More or Less": "The choice assortment of autumn novelties which the promoters have prepared for the public are as varied as ever. Industrials are considered special favourites; and here special caution will be necessary. One of the first to be brought forward will seasonably be a new method of dealing with an old light—the old light being gas. It is styled the Mantleless Incandescent Gas Corporation, Limited, and has a capital of £150,000. Mr. Crawshay Bailey, at present only known to fame in more circumscribed grooves, is assuming the "mantle" of the *haute finance*, and stands sponsor for the undertaking. Perhaps the assumption of the mantle and manners of the *haute finance* may account for the incandescent gas not having one; but we shall be able to show that point up when the prospectus is out."

A prospectus of the concern referred to has since reached this office; and it turns out to be a Company formed to purchase the patents of Thomas Rowan—Nos. 1067 and 6027 of 1895—for a double-glass argand burner of the old Bowditch and Frankland type. Both patents were abstracted in the "JOURNAL" for Feb. 18 and Feb. 25, 1896—pp. 337 and 402. Considering the fact that the validity of the patents may well be called in question, in view of the peculiar character of the Patent Experts' reports given in the prospectus, and that the clauses dealing with the purchase price and contracts entered into in respect to the formation of the Company indicate a very curious state of affairs, our contemporary's words of caution to intending investors are not a bit too strong.

To show the efforts being put forward to get some subscription of capital in advance of the public's response when (if ever) the Company is duly "advertised," it may be mentioned that copies of the prospectus are being distributed accompanied by a type-written circular-letter in these words: "In order to secure the necessary working capital, and give our clients and the trade an opportunity of participating in the underwriting commission, we have arranged for a bonus of 10 per cent. in cash or shares to be paid to the applicants for the first 40,000 shares. Such applications will be dealt with strictly in the order in which they are received. Should you therefore elect to become an original subscriber will you please fill up. . . . Numerous inquiries have been received from all parts of the world; and we firmly believe that the present issue will be considerably over-subscribed, and the shares will command a substantial premium on the market. Undoubtedly there is an immense field for an incandescent light without a mantle; and the business of the Company bids fair to rival that of the Incandescent Gas-light Company, Limited, which has been one of the most phenomenal successes of modern times." Considering that there is not the slightest similarity between the Welsbach and Rowan lights, the justice of introducing this last assertion is to say the least of it questionable.

The "Pall Mall Gazette" yesterday returned to the subject, with a paragraph headed "Naked and Unashamed," and to the following effect: The prospectus of the Mantleless Incandescent Gas Corporation, Limited, is so far public that it has been circulated among the trade. As we understand that the promoter's contract expires on the 23rd inst., it must of necessity be issued to the general public in a few days; so that it will not be premature to notice some of the salient features of the Company. The appeal has elicited from the trade subscriptions amounting thus far to £2000, out of a total capital of £150,000, in shares of £1 each. The objects of the Company, as set out in the prospectus, are to acquire, work, and develop and otherwise deal with the British, Colonial (except Australian), and Foreign letters patent for and rights in respect of the "Rowan" light. . . . Outside a limited circle of the trade, little is known of this light; and certainly very little practical working has been done, for the prospectus says nothing about the profits earned. The promoter evidently has a child-like faith in the simplicity of the public, because he adopts the child-like make-believe (and says) that there being approximately 2,000,000 consumers of gas, it is estimated that a sale of 250,000 lamps per annum would enable the company to earn a dividend of 20 per cent. . . . . It is hardly good enough for "a parent industrial home undertaking." Being unable to show what has been done on its own account, the prospectus proceeds to show what some other company has done, which is all very interesting, but beside the question. Intending investors should carefully note the clauses dealing with the purchase price and the contracts. The vendors are said to be the promoters jointly with others; the "others" including Mr. Crawshay Bailey, who has tried his hand at patents before with very qualified success. Any way, the promoters have fixed the price of this patent at £110,000, which certainly does not err on the side of modesty. In addition to this, the Company has been saddled with the expenses of registration, legal charges, usual brokerage—whatever that may mean—which is unsound in itself. The stock and plant is also to be taken over and paid for in cash on completion. So, assuming that the whole of the capital is subscribed, what will be left for working capital? The prospectus is also tainted with—in cases of this kind especially—the objectionable waiver clause. We doubt if any sort of "walloping" will make this patent go, after the manner of the proverbial donkey.

The second speculation that is "slated" by our daily contemporary is, by all accounts, to be equally avoided. The "Pall Mall Gazette" says: Mr. T. H. Watson is now issuing a private prospectus, accompanied by his compliments and strongest recommendation, inviting subscription to a concern called the "Acetylene Gas Light, Power, and Calcium Carbide Company," which is being formed with a capital of 80,000 shares of £1 each in order to acquire the patents, stock-in-trade, &c., of an enterprise mainly intended to supply acetylene gas for domestic purposes. Although the lease of the premises No. 53, Cheapside, is included in the purchase, no mention is made of the past trade or profits earned at this establishment; but we suppose it is a going concern, seeing that the goodwill is included in the purchase price of £60,000. The manufacture of acetylene gas, however, is of such a hazardous nature that we do not suppose for a moment it will be extensively used for domestic purposes, until the risk has been greatly reduced. Meanwhile, of course, the existing patents may possibly expire. For manifold reasons, we should recommend the public to leave this Company severely alone, foremost among which we would point out that we do not consider a Chairman who divides his attention between an "Estate Agency at Leeds" and the direction of some twelve or thirteen mining companies of indifferent repute, is the best possible selection. Moreover, as doubtless our readers will recall, this gentleman's spare time appears to be largely devoted to penning private circulars enticing subscription to such wild-cat companies as the "Australian Colonies Investments," alluded to in our columns only last month. We might mention incidentally that we observe without surprise that these ventures invariably contain the waiver clause in their Articles of Association.

ELECTRIC LIGHTING NOTES.

The West Bromwich Corporation have decided to apply to the Board of Trade for a Provisional Order to enable them to supply electricity at an estimated capital expenditure of £20,000.

The Local Government Board have given their sanction to the borrowing of £17,994 by the Kingston-on-Thames Town Council for electric lighting purposes. The sum named is £2006 less than the amount asked for. A tender for £2057 has been accepted by the Council for the extension of the buildings at the electric light station.

At a special meeting of the Doncaster Town Council last Wednesday, a recommendation of the Council in Committee, to the effect that immediate application be made to the Board of Trade for a Provisional Order authorizing the Corporation to supply electricity for public and private purposes in the borough, was under consideration. It was stated that, according to the Engineer's estimate, it would cost the Corporation £25,000 to supply 7000 lamps, which it was thought would be required at once, and another £25,000 to supply other parts of the borough. The recommendation was confirmed.

The electrical progress of Siam appears from the fact that the King's palace, some of the temples, and the principal streets of Bangkok are already lighted by electricity; and the "Financial News" states that an American engineer has formed a Syndicate and taken over the management of the work from the Government Department which had been carrying it on. He has obtained from the Government a contract to last for twenty years, with a monopoly of electric lighting in Bangkok. The present capital is £6000, in 100 shares, 50 of which are held by American citizens, 41 by British subjects, and the rest by Germans and Siamese. Our contemporary thinks it is probable, however, that the capital will be increased to four or five times its present amount, and the Syndicate converted into a limited liability company, registered as British.

The growth of the electricity business of the Bradford Corporation has necessitated the construction of a new station in the Valley Road; and it was formally opened by the Mayor (Mr. T. Speight) last Friday. The plant and premises have cost close upon £40,000; and the capacity is equal to 12,000 8-candle power lamps. To celebrate the event, a luncheon was served at the Town Hall, at which the Mayor (who is the Chairman of the Gas and Electricity Committee) presided. He gave those present some interesting information as to the progress of the electrical undertaking. Among other things, he mentioned that the net capital expended to Dec. 31, 1895, was £70,231, and to Dec. 31 last £104,335. The number of consumers was now 521. The total profits from the opening of the works, in September, 1889, to June 30, 1897, after paying interest and sinking fund, were £13,834; and the total amount written off for depreciation had been £4623—leaving £9211 to be appropriated as the Council might direct.

The fatal accident which occurred a short time ago to one of the employees of the Hampstead Vestry in an underground sub-station has not been without its effect. The Electric Lighting Committee recommended the Vestry on Thursday to provide a sub-station with transformer, &c., at the corner of a certain road; and Mr. Richardson moved that the matter be referred back for further consideration and report, as these underground inaccessible chambers were dangerous to the lives of the workmen, and were also a never-ending expense with their re-draining, cooling, and so forth. Indeed, according to Mr. Richardson's figures, they had each cost the Vestry £40, including the £200 paid the widow as compensation. Mr. Aitcheson seconded the motion. Mr. Hall, the Chairman of the Committee, defended the system; but Mr. Colley described his speech as simply baulking the question. Several other members followed; and Sir Henry Harben clinched the debate by saying that, if Mr. Richardson's allegations were true, the underground sub-stations were a danger to the men working in them, and that therefore the Committee should endeavour to arrange that these chambers shall be erected, where possible, on the level of the roadway. The motion was carried by a large majority. It may be added that the Vestry's electric lighting capital account now has a debit balance of £32,688; and yet the balance-sheets always show a profit of some sort.

Many local authorities have pet subjects upon which a discussion can always be raised, and over which a great deal of time is frequently wasted, with little, if any, useful result so far as the ratepayers are concerned. The governing body of Wimbledon come within this category; and the subject for which they have a particular liking is that of artificial lighting. Some years ago they fell out with the "Mitcham monopolists"—otherwise the Mitcham and Wimbledon Gas Company—over the public lighting, and then went in for oil-lamps. While it suited them to do so, some of the members thought these were all that could be desired; but this was not the universal opinion among the ratepayers, who have continually complained (to put it mildly) of their unsatisfactoriness. Next the brightness of the electric light attracted the attention of the Council; and the views of the members underwent a considerable change—the oil-lamps being actually described as "wretched." After long consideration, and a little advice from Mr. Preece, it was decided to go in for an Electric Lighting Order. This was obtained; but for a time there was some indecision as to whether or not they should go forward with a scheme prepared by Mr. Preece. Then came the County of London and Brush Provincial Electric Light Company with an offer to accept the transfer of the Provisional Order, and to supply the district from their Wandsworth station. A special meeting was held on the 29th ult. to consider the matter, with Mr. Arthur Preece in attendance, to assist the

Council in arriving at a right conclusion. The result of the discussion was that the offer of the Brush Company was rejected; and the Council resolved to construct works of their own—Mr. Preece being instructed to prepare the necessary plans and specifications. It was also decided to apply to the Local Government Board for power to borrow £32,000 for the purpose.

The electric light undertaking of the Londonderry Corporation has been referred to from time to time in our columns—not, it must be acknowledged, as one of the best examples of municipal enterprise in this direction. Of course, we can only deal with the matter upon information which reaches us; but, judging from an article which appeared lately in the "Londonderry Sentinel," we have not been far wrong in our estimate. We learn therefrom that an attempt is being made to introduce private electric lighting into the city at the public expense. The Chairman of the Lighting Committee of the Corporation is declared to be in favour of the scheme; and the Electrical Engineer (Mr. J. Christie) is stated to be ready to go ahead with it. It is frankly admitted that it will cost a good deal of money; but this appears to be "the only way of relieving the city funds of the heavy expense of public lighting." These words are quoted from a local paper which promised that the electric light would be cheaper than gas. When the public lighting scheme was being pushed forward four years ago, the most reckless estimates as to its cheapness were approvingly quoted; but all arguments based on the experience of other towns were treated with ridicule. Now a very different course is adopted. The terrible cost is deplored; and a private lighting scheme is held up as the only means of making good the deficiency. The citizens are told that they have merely to lay out £30,000 or £40,000 more, and they will get a good return for the £25,000 or £28,000 already spent. They are assured that it is impossible to keep back the extended use of the electric light. This may be so; but the Corporation will require more reliable assurances of its success than can be given by unreasoning zealots who have helped to land them in their present difficulty. The "Sentinel" says: "It is worth noting that, while possible private light customers are being privately informed that their lighting bills will not be increased by the introduction of electric lamps, it is admitted that 'it would cost a little more than gas.' What the electrical dabblers who glibly tell us that £2000 a year can be saved by the private lighting scheme have to answer is this question: Where do they expect to get consumption for enough electricity for this? In other words, where are the consumers to come from who will pay not only £2000 a year, but over and above this a sum sufficient to remunerate the Corporation for an outlay of (say) £25,000 or £30,000? This is the way to look at the matter. Let that aspect be dealt with before we are treated to any more of the old irresponsible twaddle about the splendid future in store for the light, its beauty, adaptability, healthfulness, and so forth—matters that are all beside the question at issue."

The question of expending more money on their electric lighting installation came before the Dublin Corporation at their meeting on Monday last week; but no decision was arrived at. Mr. Buckley moved the suspension of the Standing Orders to allow the consideration of the report of the Electric Lighting Committee, recommending the raising of £20,000 to equip the existing system with new cables, and the raising of £100,000 to carry out a scheme of electric lighting for the entire city, under the direction of a skilled Consulting Electrical Engineer. Mr. Buckley remarked that any person who resisted the motion would incur very serious responsibility. This, he said, was perfectly plain from the breakdowns of the past fortnight. The High Sheriff having seconded the motion, Alderman Pile thought the matter should be dealt with at a special meeting. Mr. Buckley said he would consent to an adjournment, but not later than Wednesday. Mr. Macnie expressed the opinion that in the first instance the matter should be referred to a Committee of the Whole House. Alderman Meade said there were two recommendations in the report; one being to sanction the raising of £20,000 to renew the cables of the existing system. This was a matter of necessity which must be faced. He thought this should be adopted at once. There was not the same hurry as to raising £100,000 to equip the power station close to the Pigeon House Fort. Before dealing with this question, they should have information as to what it would cost to do everything necessary, including the putting down of cables from the new station to the city. These things should be carefully considered In the meanwhile, they should not lose any time about providing the £20,000. Alderman Pile said he would agree with Mr. Macnie's suggestion. The Lord Mayor remarked that they must either adopt Alderman Meade's proposal or drop electric lighting altogether. Unless they voted the expenditure of £20,000 that day, and also gave power to engage the services of an eminent Consulting Engineer, their station was likely to be shut down before they knew where they were. He believed the proposal as to the spending of £100,000 should be adjourned to a Committee of the Whole House; but the other matter should be at once disposed of. Mr. Macnie remarked that before voting any more money for electric lighting, they should have an explanation as to how £4000 a year had disappeared. Mr. Jones said he believed the money expended on electric lighting, in the city was most extravagant and useless. On Mr. Buckley's motion being put, it was lost by a majority of one. The matter was, however, considered again at a special meeting held on Friday, when it was decided as follows: "That the entire question of the proposed new station at the Pigeon House Fort be referred to the best experts obtainable for their advice; and that such experts be asked to report, in conjunction with the Borough Surveyor and Mr. Ruddle [the Electrician], on the practical and financial features of the scheme, and what advantages would accrue to the Corporation by the adoption of it. That a system of sub-transformer stations be adopted, as such will ultimately prove a saving to the Corporation. That the entire system of cables and mains, so far as it may be found necessary, be altered or renewed. That for the purposes of such renewal the sum of £20,000 be provided; but that no portion of this amount be expended or orders given until the description of cable be reported on by the Consulting Engineer with the Borough Surveyor to a Committee of the Whole House, to be called for that purpose, and approved of by them. That the services of a first-class electrical consulting engineer, or engineers, be obtained, with a view to having his or their advice on all matters connected with the proposed changes and alterations. That the Electric Lighting Committee be empowered to apply to the Local Government Board for their sanction to a loan of £20,000."

THE LOCAL GOVERNMENT BOARD AND THE METROPOLIS WATER ACT, 1897.

Notification to Clerks of Vestries and District Boards.

The Local Government Board have issued a circular-letter to the Clerks of Vestries and District Boards, drawing attention to the provisions of the Metropolis Water Act, 1897, which came into operation on the 1st ult. The text of the Act has already been given in the "JOURNAL" (*ante*, p. 445); and its provisions are dealt with in detail by the Board.

After enumerating the several Companies affected by the Act and defining the local authorities for the purposes thereof, the letter proceeds: "Jurisdiction is conferred by the Act upon the Railway and Canal Commission to hear and determine complaints which may be made by water consumers or by local authorities with respect to defaults of the Water Companies. The Act is in addition to, and not in substitution for, any proceedings or remedy existing at the passing of the Act." Having defined the expression "water consumer" as used in the Act, the first portions of clause 1—giving consumers and local authorities the right of complaint to the Railway and Canal Commission should any Water Company fail in their duty, and conferring upon the Commission the power of making an order upon the defaulters to remove the ground of complaint, or submit to a penalty—are quoted. It is then pointed out that an appeal except upon a question of fact, or upon any question regarding the *locus standi* of a complainant, lies from the Commission to the Court of Appeal; but, subject to this, every decision or order of the Commission is final. Attention is next drawn to the fact that under section 14 of the Railway and Canal Traffic Act, 1888, the Commission may order two or more Companies to carry into effect an order of the Commission, and to make mutual arrangements for the purpose; and they may further order the Companies (or, in case of difference, any of them) to submit to the Commission for approval a scheme for carrying into effect the order. When the Commission have finally approved the scheme, they may order each of the Companies to do all that is necessary on the part and within the power of such Company to carry it into effect, and may determine the proportions in which the respective Companies are to defray the expense of so doing. For these purposes they may make, if they think fit, separate orders on any one or more of such Companies; but this provision does not authorize the Commission to require two Companies to do anything which they would not have jurisdiction to require to be done if such Companies were a single undertaking. By section 19 of the Act, the costs incidental to every proceeding before the Commission are in the discretion of the Commission, who may order by whom and to whom they are to be paid, and by whom they are to be taxed and allowed. The Board comment as follows upon the provision made for giving assistance to complaining consumers: "An important provision is contained in section 2 of the new Act, which enables a local authority to aid any water consumer in obtaining the determination of any question which appears to them to be of interest to water consumers within their district, with respect to the rights, duties, and liabilities of any of the Water Companies in reference to the quantity or quality of water supplied or the charges made by them. A local authority aiding any legal proceedings under the section may, if the Court think fit, be made a party to the proceedings, and they will be liable for costs accordingly. The aid which may thus be given by a local authority to a water consumer is not limited to cases where complaint is made to the Railway and Canal Commission; nor are the local authority subject to any restriction as regards the class of water consumers whom they may aid. If the question to be determined appears to the local authority to be of interest to water consumers within their district, it is not necessary that the water consumer raising the question should himself be a resident or ratepayer in the district in order to enable the local authority to aid him in the matter."

EAST LONDON WATER-WORKS COMPANY.

The Half-Yearly Meeting of this Company was held at the Offices, St. Helen's Place, Bishopsgate Street, last Thursday, under the presidency of Mr. GEORGE BANBURY.

The SECRETARY (Mr. I. A. Crookenden) read the notice calling the meeting; and the report of the Directors was taken as read.

The CHAIRMAN referred with great regret to the loss which the Company had sustained by the death of Mr. Fenwick, one of the Directors, and stated that the deceased gentleman paid the greatest attention to the Company's affairs. Mr. Fenwick was his (the speaker's) colleague on the Lea Conservancy, where his high character was as much respected, and his capabilities as much appreciated, as they were on the Board of the East London Company. With respect to the business of the past half year, he could describe the results of the working in a single sentence. They had had more revenue, more water, and more parliamentary anxieties than during any corresponding period since the Company was formed nearly a century ago. The revenue, when compared with that of the first six months of 1896, gave an increase of £4802. If they added to this the £4477 increase of the preceding half year, they got a total of £9279 for the twelve months, which certainly showed that they were on the upward grade. It was satisfactory to find that their meter-rental showed a sum of £1685 to the good; and should trade prospects improve, a further increase in these returns would be simultaneously apparent. They had during the past half year laid on water to 2383 new tenements, of which 2126 were outside the Metropolitan area. This brought up the number of houses connected during the twelve months to over 5000. There was an increase of 10d. per tenement in their average charge for the new comers of this half year over those of their predecessors at Midsummer, 1896—showing that some of the new buildings were of a better class. If this improvement in the style of house property in their district would only become more general, they would receive more than the present average of about £1 per house over their whole area. When he last explained their financial results, he mentioned that, with the disappearance of the adverse days of frost and drought, they might confidently look for a welcome diminution under the head of repairs and maintenance during the present year. This forecast had been fulfilled; and they found a decrease under these headings of

£9000 for this first half year. Similarly, their coal account was much less than when frost and drought unduly swelled this necessary item of consumption. As regarded the works, their principal efforts during the past six months had been directed to the completion of the new reservoirs; and the water was turned into the East Warwick last March. It was expected that the West Warwick would have been finished by June; but owing to several difficulties—mainly due to the natural formation of the soil—its completion was delayed. However, all was satisfactorily accomplished at the beginning of last month; and the reservoir was now about two-thirds full. This completed the extensive scheme sanctioned in 1894 for the additional works at Walthamstow—bringing up their storage at that station to 1200 million gallons—and for the two new high-level covered reservoirs, one at Woodford and the other at Buckhurst Hill. They would be pleased to learn—and the fact was not in the usual course of things—that all these works had been completed well within the contract time, and within the estimates. They had not experienced any difficulty from the capabilities of the West Warwick being unavailable this autumn, as the largely increased capacity of the Race Course, the new supply from the East Warwick reservoir, the resources of their old storage system, and a normal flow from the Lea had enabled them to meet all demands with a good balance in hand. But it was unsafe to calculate upon an unfailing flow from the Lea during excessively dry seasons; for the stream might fail, as on previous occasions, just when their wants were greatest. Their new reservoirs, and those lately sanctioned, were therefore an absolute necessity to safeguard their ever-increasing Essex population against all contingencies. They might have seen letters and articles in the papers regarding temporary cessation of their usual pressure, and consequent diminution of the supply to the top storeys of those exceptionally high buildings which, though few in number, were to be found in parts of their district. There was, however, never anything like a deficiency in the water itself. Still, there was no doubt some difficulty at certain times in supplying the upper storeys of these high buildings with the same continuous certainty as those of lower altitude. During the busy portion of the day, the simultaneous demand upon their mains for 3 million gallons an hour now and again decreased the pressure, and prevented the water from reaching the top floors of the lofty buildings; but when the demand decreased, the water flowed into the uppermost cisterns, filling them at least once daily, and thus preventing any inconvenience, unless waste or bad fittings upset all reasonable calculations. In order, however, to meet this occasional difficulty, and to prevent the dwellers in high latitudes from having any grounds of complaint, they had in their Bill just passed obtained power to raise capital for the construction of a new main from Islington to Whitechapel. This would considerably shorten the distance between supply and demand, improve the pressure, and enable them to utilize their ways and means to the utmost. The new main would, in fact, form the base of the two sides of the triangle the supply now traversed. It would be a costly and troublesome task; but while principally conferring benefits upon others, the Company would themselves reap some incidental advantages. Both the Government and their own Analysts certified that their supply was of excellent quality. As a rule, they came next in rank as regarded purity to the New River; but now and again they were at the top of the class. In his report to the Local Government Board during last month, the Government Analyst stated that the East London Company's water, "after filtration, was delivered to consumers in a high degree of both organic and bacterial purity." In the last return from the Registrar General, he noticed that the death-rate of London was 15·7 per 1000; while those of Liverpool, Manchester, and Sheffield were all over 22. West Ham—the large low-lying district entirely supplied by their Company—had as usual a lower death-rate than London. As regarded the removal of bacteria by their filtration, he saw the Analytical Chemists reported that during June last the mean rate of microbes per centimetre in the raw water was 67,000, but that after passing through their filter-beds only 69 specimens remained, thus practically disposing of the whole of them. They might, perhaps, have seen in the papers a letter saying that the conviction of persons by the Company for bathing at Chingford, showed that London might suffer from an outbreak of typhoid like Maidstone. The conditions of the two cases, however, were so totally different that this alarming announcement was hardly good enough for the reading public, even at this season of the year. In their case, the Chingford water flowed through an open stream into their 300 acres of reservoir, whence, after aëration and oxidation, it passed to the filter-beds, where, as already shown, all deleterious matters were eliminated. At Maidstone, the water was delivered from the actually polluted springs direct to the consumers. As a matter of sentiment, they stopped the bathing as far as possible, though the banks at Chingford were public ground. But by their new Act, the stream would be diverted through the Company's own property, and thus be far more easily guarded and protected. With reference to their parliamentary matters, the most important event that had befallen them during the past half year was the passing of their Bill last session. He would briefly explain its particulars, and some of the perils it underwent before it became an enactment. It had improved their position in every way, and furnished them with the means of fully meeting their liabilities from drought or increased demands for years to come. The main object of the Bill was to enable the Company to construct in the Lea Valley two more reservoirs, thus carrying out part of the scheme approved by Lord Balfour's Commission. The Bill authorized them to raise the money required for this and other necessary minor objects, the chief of which was the large additional main to improve their pressure and distribution. Though the Bill was of this simple character, and its object was strongly commended to the House by the President of the Local Government Board, it met with considerable opposition, the main grounds of which he would mention. It was opposed at the second reading stage in February by Mr. Paulton, on behalf of the Commons Preservation Society, because the site of the reservoirs included some 100 acres of Lammas lands, which, it was suggested, might some day or other be available for recreation if not absorbed into the water-area. This opposition was averted by the Company agreeing to an instruction to the Committee that they should inquire into the whole of the question of the Lammas land to be taken, and decide what was fair and proper in the way of compensation. The Company stated from the first, and afterwards fully proved, that the spot was cut off, inconvenient, wet, frequently waterlogged, and had never been used as playing fields. The Society suggested that the Company should purchase equivalent acreage elsewhere for recreation purposes—in other words, that they should be made to pay not only for the site itself, but also for an additional 100 acres elsewhere, to be given over to the public. Then, in May, two further instructions to the Committee appeared. The first was by the member for Walthamstow, to provide that the Company should give a constant supply in the country districts without the safeguards contained in the Metropolis Water Acts of 1852 and 1871 which prevailed wherever constant supply was given; and the second was moved by the member for West Ham, that outside the Metropolitan area rateable value as appearing in the valuation lists should be compulsorily taken by the Company as the basis on which they should charge, although the Act which ensured within the Metropolis a proper value, was not and could not be made to apply outside. The first of these propositions was ultimately withdrawn; and the other was never carried to the second reading. He would merely say about these two important instructions that, if the first of them had passed, the Company would have been at the mercy of the consumers as to fittings; and if the second had passed, they would have been at the mercy of the local authorities as to rateable value. When they got into Committee, the London County Council, of course, opposed them; and the Commons Preservation Society fought hard for their views. But in the end the Company got their Bill; and the Committee decided that they might at their option either set apart for public purposes 25 out of the 100 acres which they proposed to take for their reservoir, or provide 25 acres elsewhere. Their troubles were, however, not yet at an end. In the House of Lords, Mr. Courtney Warner and Mr. Sinnott, both landowners, opposed the Bill because they wanted certain facilities for crossing the reservoirs. Mr. Bryan had offered excellent accommodation to them early in the year; but this was refused. Ultimately, after putting the Company to all the expense of preparing for an opposed Bill, these opponents accepted, in effect, the terms originally offered. The Bill then went safely through the Lords, and became law on the 6th of August. He told them at their last meeting that the London County Council had reintroduced the unfair and unheard-of Purchase Bills which were thrown out by the House last year; but they shared the fate of their predecessors, and were rejected on the second reading. Mr. Chaplin promised, however, a Royal Commission to inquire into the policy of sale or control, and also a Bill giving to water consumers and local authorities greater facilities for "bringing to book" the Water Companies on their failing in their statutory duties. The Commission had been formed of men of acknowledged capabilities and impartiality. It was to be presided over by Lord Llandaff; and he did not think they need fear the result. They obtained a favourable verdict from the Royal Commission of 1892; and they were certainly in a better position now than they were then. They were preparing to give the Commission all the assistance and information they might require. As to Mr. Chaplin's Bill, they never dreaded impartial inquiries, as they had hitherto been beneficial to them; and if this enactment resulted in consumers bringing their complaints before a tribunal where the Company could be heard, instead of writing one-sided and inaccurate statements to the papers, they would have cause for congratulation. While upon the subject of Parliamentary Bills, they would be interested, and doubtless surprised, to learn that during the last twelve years the Commissions, Local Government Board inquiries, and Bills introduced into Parliament affecting the East London Company, jointly or individually, reached a grand total of 34. These might be analyzed thus: Bills introduced into the House of Lords, 2; Royal Commissions, 2; Local Government Board inquiries, 2; Sir Matthew White Ridley's Committee and the River Lea Commission, 2; Bills (mostly hostile to them) introduced into the House of Commons, 22; and their own Bills for improved supply, 4. The consolatory moral to be drawn from these somewhat remarkable figures was that evidently their system must be pretty good, and their constitution pretty sound, or they would have passed away under this enormous load of litigation, investigation, and would-be obliteration. They must, however, gratefully acknowledged that from time to time the justice, fairness, and business capacity of the House had rendered attacks upon them harmless and ineffective. Their colleague, Colonel Lockwood, member for the Epping Division of Essex, was unavoidably absent. They were greatly indebted to his exertions and conciliatory tact for the satisfactory results of last session. Their colleague was heartily and ably assisted by the members for Marylebone and Peckham; and their thanks were due to these gentlemen, and to other members who had thus safeguarded and maintained the Company's "imperial interests." As usual, they had received every aid from their Secretary and Engineer. They would naturally have noticed that this half year they paid a dividend ½ per cent. per annum more than they had done of late. This was satisfactory, and showed that they were financially recovering from the effects of frost and drought. But they might not improbably wish to know when they were likely to revert to the better days of 8 per cent. They were dependent upon the state of trade and upon the character of the new houses in their district for any substantial increase in revenue; but should no unforseen cause arise to prevent it, there seemed reasonable hope of their being able before long to increase the rate of dividend now declared. He concluded by moving the adoption of the report and the declaration of a dividend at the rate of 7½ per cent. per annum (less income-tax) on the ordinary stock for the half year ended Midsummer last.

Mr. H. Dalton seconded the motion.

Mr. Cuff said he noticed that no charge was ever made in the accounts for depreciation. He wished to ask whether the Directors considered that the item of maintenance and repairs fully covered depreciation.

The Chairman replied that the question had often been before the Board. They sometimes spent as much as £18,000 to £20,000 in a half year; and they considered that the keeping up of the mains and engines in full working order was quite equivalent to their writing off anything for depreciation.

The Secretary remarked that they could not do both.

Mr. F. Brown said that he had come some distance for the purpose of inquiring when they might expect to return to their former dividend of 8 per cent.; but after what the Chairman had said, he felt that it was quite unnecessary for him to ask anything about the matter. He felt sure that the Directors were doing everything they could to promote the Company's welfare; and he hoped that they might now have some little peace before them.

The resolution was carried unanimously.

Mr. BROWN proposed a vote of thanks to the Chairman and Directors, the Engineer, the Secretary, and the staff. He warmly recognized their services, and alluded with satisfaction to the way in which the affairs of the Company had been managed in the past six months.

Mr. CUFF seconded the motion, which was carried unanimously.

The CHAIRMAN, in acknowledging the vote, said it was a great comfort and strength to them to have the goodwill and good wishes of the shareholders. If another severe frost should occur, they were better prepared now than formerly to encounter it.

The proceedings then terminated.

RATING OF METROPOLITAN WATER COMPANIES' RESERVOIRS.

At the Meeting of the Sunbury District Council on Monday last week, a Committee who had been appointed to consider the question of the rating of reservoirs, reported that they had discussed the matter with representatives of the Hampton District Council, and were informed that with regard to the new reservoir recently constructed by the Southwark and Vauxhall Company, the Hampton Council had sent in a demand for a rate based on the full assessment, which the Company declined to pay, as they contended that the reservoir was "land covered with water" within the meaning of the Public Health Act, 1875, and therefore only assessable at one-fourth of the rateable value. The Hampton authority intended taking proceedings for the recovery of the rate in full. The Committee thoroughly concurred with the opinion of the Hampton delegates, that it could not have been the intention of the Legislature that what was virtually a building for the storage of water for the purposes of profit, and which brought in a large revenue to the Company, should be treated for rating purposes merely as "land covered with water." As the question was one of the utmost importance to Sunbury, on account of the large reservoirs in course of construction and about to be constructed in the district, they recommended that, in the event of the decision of the Bench being against the Hampton Council, or of an appeal by the Water Company, the opinion of some eminent Counsel be taken at the joint expense of both Councils, as to the proper meaning of the Act. The report was adopted without discussion.

THE OUTBREAK OF TYPHOID FEVER AT MAIDSTONE.

The lamentable epidemic of typhoid fever at Maidstone, the origin and development of which were dealt with in the "JOURNAL" last week, has not, unfortunately, shown any sign of abatement. Up to last Saturday 1551 cases had been recorded—an increase of about 250 in the week—and the number of deaths had risen to nearly 60. As already stated, the whole of the Farleigh water—the condemned source—has been cut off; and early last week the Directors of the Water Company called in Mr. Charles Hawksley, M.Inst.C.E., to advise them as to extending their works at Cossington and Boarley so as to make up for the curtailment of the supply. The springs at these places were found to be yielding exceedingly well; but, of course, the water could not be stored. As the result of Mr. Hawksley's visit, prompt measures have been taken to obtain additional water at Boarley. In the meantime, a connection is being made by Messrs. John Aird and Sons at Cossington with the mains of the Mid-Kent Water Company, whereby an additional supply of 100,000 gallons of water daily will be obtained. Mr. Hawksley has also inspected some copious springs at Otham, which have been generously placed at the disposal of the Company by Alderman Samuel. The District Council have had under consideration a letter from the Local Government Board with reference to their demand for a public inquiry into the cause of the epidemic. The Board reminded the Council that Dr. Thomson was already investigating the circumstances of the outbreak, and stated that, while they were desirous of offering every possible assistance to the local authorities in the present emergency, they did not think the holding of a public inquiry would in any way further Dr. Thomson's investigations, or assist in dealing with the matter. The Town Clerk (Mr. H. Monckton), in reply to a question, said Dr. Thomson would in due course present a full report, and he had no doubt it would be made public. Alderman Dann said this was not what the inhabitants of the town wanted. They would not be satisfied with anything short of a full public inquiry. Mr. Urmston moved that the letter of the Local Government Board be acknowledged, and that they be informed that the Council still adhered to the wish expressed in their resolution of the 29th ult.; and proposed to make a further application in the matter at a later date. The Mayor expressed his concurrence; and the motion was carried unanimously. At the same meeting, the Medical Officer of Health (Mr. M. A. Adams) presented a report, in the course of which he stated that, acting upon his advice, which was supported by Drs Washbourn and Thomson, the Water Company had cut off the whole of the Farleigh supply on the 30th ult.; and that since this date the town had been supplied through the mains with chalk water only, from Boarley and Cossington, and through the conduit with ragstone water. These were both good waters; and from the results of his analyses he was confident that no further anxiety need prevail concerning the wholesomeness of the present supply. The relief fund which has been opened has now reached £6000; but considerably more will be needed to enable the authorities to cope satisfactorily with the distress resulting from the epidemic.

The "Penny-in-the-Slot" System in Artisans' Dwellings.—At the meeting of the Commissioners of Sewers of the City of London last Tuesday, it was referred to a Committee to consider the desirability of allowing all tenants in artisans' dwellings to have gas connected with their rooms on the automatic prepayment system.

St. Helens Corporation Gas Committee and the Formation of a Reserve Fund.—The St. Helens Gas Committee having decided to form a reserve fund, and the Corporation Acts not authorizing such a course, the Town Clerk has been instructed to apply for a Provisional Order to sanction the establishment of a fund not to exceed £25,000,

THE WATER-WORKS PURCHASE QUESTION AT FELIXSTOWE.

A Bill to be Promoted.

At the Meeting of the Felixstowe and Walton District Council last Wednesday, the Finance Committee presented a report with reference to the contemplated purchase of the water-works. It appeared therefrom that, since the Council decided to promote a Bill for the purpose on June 2 last, Mr. W. B. Bryan, M.Inst.C.E., had been consulted; and he considered the Council were placed in an exceptionally favourable position under section 37 of the Water Company's Act of 1895. Mr. Bryan went thoroughly into the question of the present and probable future supply of water, together with its purity, referring to the various analyses which had been made, and which were of a generally satisfactory nature. If the Council were satisfied that there was an abundance of water obtainable from the Company's existing wells, he had no hesitation in advising them to introduce a Purchase Bill, which, if produced within the period mentioned in section 37 of the Company's Act, would make the procedure comparatively simple; otherwise obtaining an Act would be costly. In the meantime, the Council were recommended to obtain the fullest particulars with regard to the Company's wells, plant, &c. The Committee further mentioned that many samples of water had been taken, with very satisfactory results on the whole; but the water was of extreme hardness, and subject to considerable variation, which they were advised ought to be carefully guarded against. For this reason, as well as many others, it would, in their opinion, be well that the Council took over the concern; and in this the Medical Officer concurred. The Committee advised that the undertaking should be acquired on the following, among other grounds: "(*a*) That, as fully acknowledged by Parliament, by the Local Government Board, and by other authorities, the water supply of every district should be in the hands, and under the control, of the Local Authority, who would act for the best interests of all, including the precautionary measures to prevent injury from sudden variation of quality. (*b*) That the whole of the purchase-money and expenses would be provided by a loan, the repayments of which, with the interest, by equal half-yearly instalments, will extend over a large number of years. (*c*) That the repayments of such loan and interest thereon and the working expenses would not exceed, and would be fully provided for by, the present income from the water-rate. (*d*) That all expenses of rate over repayments of loan after providing for contingencies would go in reduction of water-rate, by which all would benefit, instead of being paid away as dividend into the pockets of a few, and they possibly not ratepayers." In moving the adoption of the report, Mr. Downing said the Committee had considered the whole matter very carefully. Inasmuch as the health of the whole district was now in the hands of the Council, he thought it was their duty to transfer the water-works. The public might perhaps take exception to some parts of the report—such as the one which spoke of the water being of a varying character—and think that the works were not worth buying. Of course, experts would go thoroughly into the matter in the interest of the locality. The motion having been seconded, the Chairman (Mr. F. W. Mason) said the question was what was the best thing to do in view of all the circumstances. It was perhaps doubtful whether the present time was quite opportune for entering upon an undertaking of this sort. It was easy to understand that a Company might carry on works of the kind more economically than the Council could at present hope to do. The members of this body were all business men; and there were probably few of them who could give the time and attention which the business would demand at their hands. As Felixstowe increased, and property became more valuable, they would be in a better position to buy the works, even perhaps if they had to pay more money for them. Mr. Downing pointed out that the members must not lose sight of the £600 or £700 they had already expended in opposing the Company's Bill. The motion was passed; and a resolution was also adopted agreeing to promote a Bill in the ensuing session of Parliament for the purchase of the undertaking. A requisition to the Chairman to call a meeting of ratepayers to consider the matter was afterwards signed by several members.

NEWPORT CORPORATION WATER SUPPLY.

Failure of the Wentwood Scheme—Resignation of the Engineers.

A Special Meeting of the Newport County Council was held last Tuesday—the Mayor (Mr. T. Goldsworthy) presiding—to consider the whole question of the Wentwood water undertaking, at which failures have from time to time occurred during construction. The chief defect now reported upon by the Water Committee, after examinations by Mr. Baldwin Latham, M.Inst.C.E., and Mr. D. B. Butler, Assoc.M.Inst.C.E., F.C.S., was with reference to faulty concrete filled into the puddle trench. The Committee regarded their Chief Engineer (Mr. Conyers Kirby) as primarily responsible for the defective work, and the Resident Engineer (Mr. Curry) largely to blame for the present condition of affairs with respect to the trench, in that he did not report to them direct the serious doubts which it appeared he had entertained for some little time as to the manner in which the work of making the concrete and filling it into the trench was being proceeded with. Both of these Engineers have resigned; and the Committee recommended that Mr. Kirby should be paid £1000 in addition to the commission already paid him—viz., £3500. The voluminous report of Mr. Baldwin Latham was read by the Town Clerk (Mr. A. A. Newman). In this he gave many details as to the leakages which had taken place. Some question had, he said, been raised in the district as to whether the quality of the water did not act injuriously upon the concrete. He appended an analysis of the water, which showed that it was much the same as that which is now supplied to Newport. It was a little softer, and contained a little less solid matter. The concrete was not injured by being submerged in it; but it was injuriously affected by being overwatered in mixing. He generally attributed the faulty work to inattention to details, and to the trench being filled in in too great a hurry. The reply of Mr. Conyers Kirby to the reports of Mr. Baldwin Latham and Mr. Butler was also read. He pointed out that, in a report he made to the Committee on April 5 last, he strongly pressed—and in this he was supported by the Resident Engineer—for the appointment of inspectors for the detailed examination

of the concrete. The Committee decided to visit the works; and, having done so, they came to the conclusion that it was not considered necessary or desirable to appoint inspectors. Mr. Curry's report was a very long one. He referred to the fact that he complained to the Manager of the works (Mr. Macdonald), who was appointed by the Corporation, that the materials were not measured and gauged as required by the specification. The Manager replied that better concrete was being made. Mr. Curry drew the attention of the Chief Engineer to the way in which the concrete was being made; but Mr. Kirby subsequently informed him that the Committee were satisfied with the work. A long report was also read from the Manager, who said there was no foundation for Mr. Baldwin Latham's statement that the concrete was disgracefully made.

The Chairman of the Committee (Alderman C. Lyne) moved the adoption of their report. He said there had been from the first a certain amount of cavilling outside as to the feasibility of the Wentwood scheme, though among the members of the Corporation, with one or two exceptions, there had been perfect harmony on the subject. He believed the works were second to none in the country, and the foundations were good. If the town was not justified in throwing them over when they had spent £70,000 on them, how much less were they justified in doing so now, when £100,000 had been expended. The works would certainly cost far more than was at first expected. The Committee had acted perfectly straightforward towards the Corporation. If they looked at the sister town of Cardiff, they would see that a reservoir had just been opened for that town with a capacity about the same as the Wentwood, which cost £200,000; whereas the outlay at Wentwood up to date was £100,408. Mr. Brown proposed, as an amendment, that Mr. Kirby should be paid such sum, together with the £3500 already paid, as represented 4 per cent. on the outlay, after deducting the cost of lands, the purchase of plant, and the sum paid to Mr. Young, the former Contractor, to give up his contract. Mr. Wilkinson seconded the amendment. He said he thought the failure of the works so far had been largely the fault of the Committee themselves. The Town Clerk said, if the amendment was carried and strictly interpreted, they would have to ask Mr. Kirby to return some of the money already paid to him. After considerable discussion, the amendment was defeated by 17 votes to 16. Another amendment was submitted that the whole report should be referred back for further consideration; but only the mover and seconder voted for it. The Committee's report was then adopted.

A LARGE WATER SCHEME FOR EAST NORTHUMBERLAND.

Last Thursday afternoon, a Conference of Local Authorities in East Northumberland was held in the Cowpen Council Chambers at Blyth, to consider a project for supplying that part of the county with water. Mr. Charles Barron, J.P., Chairman of the Cowpen Council, presided; and the authorities represented were the Morpeth Rural Sanitary Authority, Tynemouth Rural Sanitary Authority, South Blyth District Council, and Cowpen District Council. The Chairman said the conference had been convened with a view to getting the various authorities in East Northumberland to co-operate for the purpose of forming a Joint Water Board to enable them to apply for parliamentary powers to utilize the water now flowing from the Simonside Hills at Great Tossan, as well as the waters of the River Alwin at Alwinton. The total yield of the gathering-grounds mentioned was something like 3,500,000 gallons every 24 hours. The distance from Alwinton to North Shields was 41 miles, with an average fall of 10 feet to the mile; and on the route in close proximity to the proposed lines of pipes were Morpeth, Ashington, Newbiggin, Bedlington, Blyth, Whitley, and Tynemouth. The total population of the districts was 130,798, which, according to Local Government Board requirements of 20 gallons per head per 24 hours, made the quantity required 2,615,960 gallons per day, as against the available 3,500,000 gallons. The cost of carrying out the scheme would be about £195,000, including land, mains, reservoirs, &c. This was the estimate of the cost made some years ago by the water engineers who then had the scheme in hand; and a fair apportionment would be: North Shields, £77,966; Bedlington, £23,284; Tynemouth Rural, £33,284; Cowpen, £15,515; Ashington, £11,935; Morpeth Rural, £8222; Whitley Rural, £12,217; South Blyth, £10,238; and Newbiggin, £2289. To extend the loan over a period of 50 years at the rate of 3½ per cent. per annum, the principal, together with the interest thereon, including all working expenses, would mean £9380 to be paid annually by the united authorities. This would amount to 5d. in the £ on the rateable value in the respective districts; and a little more than 2½d. per 1000 gallons. At the expiration of the 50 years, the entire works would, of course, become the absolute property of the joint authorities. Subsequent speakers doubted whether any assistance would be given by Morpeth, Ashington, and the Tynemouth Rural District Council. Mr. T. R. Guthrie, the Clerk, read a number of letters he had received from surrounding authorities, showing that Newbiggin had decided to take no further part in the project; that Amble was in favour of it, and had appointed their Clerk to watch the preliminaries; that Whitley and Monkseaton had elected representatives to attend the conference; that Ashington deferred their decision pending the Analyst's report respecting a new supply; that Morpeth had not sufficient data on the subject to express a definite opinion; and that the Tynemouth Corporation had not come to any decision. A resolution was passed inviting the several authorities named to appoint a Committee for the purpose of "obtaining all the necessary information respecting the watersheds at Great Tossan and at the River Alwin, and to consider the advisability of adapting the same to meet the requirements of the respective districts."

Exeter Water Supply.—The Water Committee of the Exeter Corporation have decided to recommend the Council to spend £25,000 in improving the water supply of the city. The money will be employed in purchasing land and laying out new filter-beds at Pynes, and putting up three fresh turbines; those already in use having been found to answer well. An intermediate reservoir will also be constructed, and fresh machinery purchased. These works will ensure for the citizens a constant and pure supply of water for some years.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Glasgow is great in the matter of Corporation loans. The amount which has been borrowed by the Corporation direct from the community, amounts to about £6,000,000. They manage their affairs economically, for the total cost to the city of the care of this large sum of money is only about £1000 a year. In Liverpool, where they have a Corporation loan fund a little larger, the cost of managing it is about £4000 a year. The Glasgow fund is still growing. This week the Finance Committee had before them a statement by an official, to the effect that next month a sum of £334,332 would be required for new works in connection with the police, gas, and electric departments, and for city improvements. The Committee authorized the issue of £250,000 stock at 2½ per cent., to meet the expenditure. At a meeting of the Corporation this week, too, Mr. R. M. Mitchell intimated that it was the intention of the Gas Committee, of which he is Convener, to apply to Parliament next session for increased borrowing powers to the amount of £1,000,000. Their existing borrowing powers, he said, were almost exhausted; and they were looking forward to the erection of new gas-works, and to larger demands being made upon them by the Electricity Committee. The Gas Committee were still responsible for the outlay of the Electricity Committee; the accounts not having been separated. This arrangement, Bailie Chisholm said, would have to be fully considered; and Mr. Mitchell replied that no one would be more thankful than he would. Of course, the accounts will require to be separated. It will never do to have one Committee responsible for the outlays of another, whose works they have not the control of.

In their consideration of the contracts for the supply of cast-iron pipes for the ensuing year, the Glasgow Corporation Gas Committee have encountered one of those situations in the industrial world which, to the credit of our workers be it said, have not hitherto happened with such frequency as to be noteworthy—in which the foreigner can undersell us, in our own country, with a manufactured article, for the production of which we are particularly well placed. The Committee found that a firm in Philadelphia offered some of the larger sizes at £1 per ton less than any of the tenders from this country. The Committee did not accept the offer; neither did they reject it. They were favourably impressed by it, as it would mean a saving of between £800 and £900 to them; and they continued the subject for the purpose of making inquiries as to delivery of the pipes—whether a guarantee could be given that they would be delivered in time and in good order. It is also announced that a London firm have been offering to the Dundee Water Committee American-made cast-iron pipes, warranted equal in quality to home-made ones, at from £3 15s. to £4 5s. per ton, according to size and quantity. The price at present paid by the Committee for pipes of Scotch and Cleveland iron, is from £6 to £6 10s. per ton. Evidently an attempt is being made to open up a trade in pipes with this country. It is stated that about 10,000 tons of American-made pipes are at present under contract for delivery in the United Kingdom. If this be so, the object-lesson afforded by it ought to be sufficiently pronounced as to be unmistakable by anyone. There may be some who are so blind as not to see that, unless we can produce goods cheaper, quality always considered, than other nations, those other nations will get our trade. If there be, a few incidents like those in Glasgow and Dundee ought to form a sort of message in raised letters, which they must perforce feel if they will not look at.

Reduction of the hours of labour is one of the causes of loss of trade. An eight-hour day is the cry at present with some of the industrial classes. But it is observable—and, indeed, should not be overlooked—that the cry is that of the leaders, or agitators, and not of the men. Even in the great engineering trade, the eight-hour day was demanded by the Executive without a ballot. An instance of the same operation occurred in Edinburgh last night. There are two bodies who aspire to be labour leaders—one the Trades' Council, and the other the Social Democratic Federation. These two bodies combined their energies upon the subject of the hours of labour of all the city employees. No one of these, they hold, should work more than eight hours a day. They called a mass meeting of the employees for last night, to, in the words adopted by themselves in their advertisements and handbills, "urge the necessity for an eight-hour day." This expression clearly shows that they themselves recognize that the men require to be educated on the subject. Only about fifty men out of several thousands attended, which again proves that the men do not consider their burdens to be grievious. Those who organized the meeting, however, notwithstanding that the workers had stayed away, asked and obtained the permission of those present, in the name of all the city employees, to go forward with the subject, and to press it upon the attention of the Town Council. I daresay what is wanted, more than the welfare of the workers, is an organization, from the members of which threepences could be levied. It was argued that the city should be the first to give an eight-hour day, which was absurd, because city employees have already privileges, in the matters of whole time, attendance during sickness, and the like, which make their lives the envy of those who have not got inside the circle. It is a delightfully instructive situation which has arisen. The corporate bodies are to be pestered by professional agitators to grant their employees something which the employees have not themselves asked for. This vicarious nature of the movement should not be lost sight of, and should be sufficient to lead to its being nipped in the bud. One of the speakers singled out the gas workers for his special attention. They were, he said, credited with already having an eight-hour day. "Well," he remarked scathingly, "he did not recognize it, and he supposed the gas workers did not recognize it either; for they had to work more than six days in the week." There is a little point in this statement, for Sunday labour is an objectionable thing, and should be discouraged as much as possible. But any movement of this nature should arise among the men themselves, and not among the Socialists; but having originated with them, employers should remember that their avowed purposes are much more far-reaching than the mere shortening of the hours of labour, and be consequently prepared to treat the movement with this reflection in their mind.

In Dundee, the amount collected for gas consumed during the four months of the financial year which have elapsed has been £17,689, which is £1122 more than in the corresponding period of last year. The

electricity rental was £1029, or £152 more than during the four months of last year. The Gas Committee of the Corporation this week considered the subject of acquiring ground upon which to extend the gas-works. A Sub-Committee which had been in negotiation with the owners of the ground, reported that the owners had offered first to sell a portion of the ground at a sum equal to £2 per pole for frontage ground, and £1 10s. per pole for back ground, subject to an annual feu-duty of £327 10s.; and that afterwards they offered to sell the whole plot for £9300, subject to the same feu-duty. The Committee agreed upon the latter course. They then remitted to their Manager (Mr. W. M'Crae) to report to them as to the necessary additions to the works, if carburetted water gas were adopted. He is also asked to state what the cost would be of extensions for the augmentation of the coal-gas supply, on the lines suggested in the two reports by Mr. W. Foulis.

The practice in Dundee has been to only light half of the public lamps in the city during moonlight, a most unsatisfactory and troublesome system to work, as there are few things which are more variable than the rising and setting of the moon. The Gas Committee have resolved that in future they will altogether omit to light the lamps in the outskirts of the city for one month in summer; and with the gas thus saved, they are to improve the lighting of the whole of the streets in winter. But the estimate is not to be exceeded. They have also resolved to replace a number of 2 feet burners in the centre of the city with 3 and 5 feet burners. I cannot say that I admire the arrangement about the outskirts of the city. It looks like biting too much at a cherry. It is an arrangement which will be very difficult to work, and which may be expected to produce discontent. I can imagine dwellers in the suburbs grumbling at having to pay the same rates as others, when they do not get the same amount of lighting; and I can also anticipate the outcry there will be should a burglary or a personal outrage take place in a suburban district. Though it may cost a little more, a uniform system is both easier for the officials to work, and gives more satisfaction to the community.

The shareholders of the Newport Gaslight Company (Fifeshire) held their forty-first annual meeting last Saturday. It was reported that the balance of profit for the year amounted to £652. In terms of the recommendation of the Directors, it was resolved that, after making provision for depreciation of the works and plant, a dividend at the rate of 5 per cent. should be paid; leaving £152 to be carried forward. The Chairman stated that the consumption of gas was steadily going up, but that with their new gasholder they would be able to meet the requirements of consumers for many years to come. The shareholders also resolved that the Company should in future be a permanent one, and not a co-partnery for a number of years, as it has hitherto been.

The Town Council of Hamilton are under the necessity, in consequence of the rapid increase of the town, to procure an additional supply of water; and they are to promote a Bill in Parliament next session, to give them the necessary powers for the purpose.

The Edinburgh and District Water Trust have begun the active construction of the great reservoir at Talla, which is to be the centre of the augmented water supply authorized by their Act of 1895. Since the Act was passed, the Trustees have been engaged in the construction of a service railway to the site of the reservoir, and in proving the foundations for the great embankment. These are now completed; and at the end of last month, the Trustees and their friends, to the number of 180, journeyed to the spot by special railway train, and took part in the ceremony of laying a memorial stone.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Oct.* 9.

Sulphate of Ammonia.—There has been a quieter market during the week; and prices have been barely maintained. Speculators seem disposed to wait until late in the month before covering their October requirements. Meantime, they have been directing their attention to depressing the market by second-hand selling at home, and offering abroad at prices considerably below the equivalent of f.o.b. quotations. It would seem, however, that these low offers have been more largely availed of by buyers than was desired; and they have now been advanced to about the f.o.b. level. Closing quotations are £8 to £8 2s. 6d. per ton f.o.b. Hull and Leith, and £8 3s. 9d. per ton f.o.b. Liverpool. With a quiet spot market, there has been less interest in the forward position; the quotations £8 5s. per ton October-December, and £8 10s. per ton January-March, not attracting attention.

Nitrate of Soda remains quiet at 7s. 4½d. per cwt. for good, up to 7s. 6d. for fine quality.

LONDON, *Oct.* 9.

Tar Products.—Benzols are again easier, with a tendency to lower prices. Pitch is quiet, and buyers indifferent. Large shipments of pitch are being made, but chiefly on old contracts. Crude naphtha is dull; and much lower prices are offering. Creosote is more plentiful; and although the market is fairly firm, there is a tendency on the part of makers to press sales. The higher prices asked for Scotch blast-furnace oils have benefited the English production materially; but it is doubtful whether the existing disparity of prices will continue. Business in anthracene is reported at low prices for makes outside the Committee; but as these are of inferior quality, they form no guide as to the market value of the article.

The average values of products taken all round are: Tar, 17s. to 21s. Pitch, 17s. to 20s. Benzols, 90's, 1s. 10½d.; 50's, 1s. 11d. Toluol, 2s. 1d. Solvent naphtha, 1s. 7d. Crude, 30 per cent., naphtha, 10½d. Creosote, 1⅞d.; liquid, 2d. Heavy oils, 35s. Carbolic acid, 60's, 1s. 10d. Naphthalene, pressed, 50s.; salts 25s. Anthracene, "A," 5½d.; "B," 4½d.

Sulphate of Ammonia is not so firm. The higher prices asked recently have choked off buyers for the moment. Fortunately there are no stocks of any account in the hands of makers. As sulphate has done so remarkably well for agriculturists during the past season, the prospects of its enlarged use are encouraging. To-day's values are nominal, with no business doing at rates quoted, which are Beckton, £7 15s.; London, £8; all other ports, £8 to £8 2s. 6d., less 3½ per cent.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST

Referred to on p. 786.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.	Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.	£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Apl. 9	1½	Alliance & Dublin	10 p. c.	24½—25½	..	4 2 4	3,800,000	Stk.	May 13	10	Imperial Continental .	220—225	+3	4 8 11
100,000	10	,,	7½	Do.	7 p. c.	17—18	..	4 3 4	376,400	100	Aug. 3	4	Do. 4 p. c. Dbs. Red.	99—102	..	3 18 5
300,000	100	July 1	5	Australian 5 p. c. Db.		106—108	..	4 12 8	473,600	Stk.	Aug. 12	5½	Do. 3½ p. c. Db. Stk.	„ 104—107	..	3 5 5
200,000	10	May 27	7	Belgrano (B. Ayres), Ltd		10—10½	..	6 13 4	75,000	5	June 29	6	Malta & Medn., Ltd. .		5½—6	..	5 0 0
100,000	Stk.	June 29	5	do. 5 p. c. Db. Stk.		105—107	+1½	4 13 6	560,000	100	Oct. 1	5	Anglo-Mexican } bourne	5 p. c. Db.	110—112*	..	4 9 3
200,000	5	May 27	6½	Bombay, Ltd. . .		6¾—7¼	..	4 9 7	250,000	100	,,	4½		4½ p. c. Db.	106—108*	..	4 3 4
40,000	5	,,	6½	Do. New, £4 paid .		6¼—5¾	..	4 10 7	541,920	20	June 11	5	Monte Video, Ltd. . .		15—16	..	6 5 0
380,000	Stk.	Aug. 27	1¤	Brentford Consolidated		300—305	+3	3 18 8	100,000	5	May 27	8	Oriental, Ltd. . . .		8½—8¾	..	4 11 5
240,000	,,	,,	9	Do. New . . .		222—227	..	3 19 3	125,000	5	,,	8	Do. New, £4 10s. pd.		7¼—7¾	..	4 12 10
50,000	,,	,,	5	Do. 5 p. c. Prf. .		145—150	..	3 6 8	15,000	5	,,	8	Do. do. 1879, £1 pd.		1¾—2	..	4 0 0
159,375	,,	June 11	4	Do. 4 p. c. Db. Stk.		135—139	..	2 17 6	60,000	5	Sep. 30	7	Ottoman, Ltd. . . .		4½—5*	..	7 0 0
220,000	Stk.	Sep. 15	1¼	Brighton & Hove Orig.		270—275	..	4 3 7	420,000	100	May 3	6	People's Gas } of Chicago }	1st M. Bd.	104—109	..	5 10 1
208,820	,,	,,	8½	Do. A. Ord. Stk.		200—205	..	4 2 11	500,000	100	June 1	6		2nd do.	105—110	..	5 9 1
933,500	Stk.	Aug. 27	5	Bristol, 5 p. c. max.		130—135	..	3 14 1	250,000	10	Sep. 30	10	San Paulo, Ltd. . . .		14½—15½*	+½	6 9 0
420,000	20	Sep. 30	11½	British		55½—56½*	..	3 19 7	5,475,000	Stk.	Aug. 12	5½	South Metrop., 4 p.c Ord		145—148	..	3 10 11
50,000	10	Aug. 27	11½	Bromley, Ord. 10 p. c.		26—27	+2	4 5 2	1,416,667	,,	July 15	3	Do. 3 p. c. Db. Stk.		106—109	..	2 15 0
71,000	10	,,	8½	Do. 7 p. c.		20—22	+2	3 17 3	60,000	Stk.	Sep. 15	12	Tottenham and } Edmonton }	A. .	280—290	..	4 2 9
500,000	10	Apl. 28	6	Buenos Ayres (New) Ltd		10½—11½	..	5 4 4	60,000	,,	,,	9		B. .	205—215	..	4 3 9
98,122	Stk.	—	4	Do. 4 p. c. Db. Stk.		98—100	..	4 0 0	182,380	10	May 27	10	Tuscan, Ltd.		13½—14½	..	6 18 0
150,000	20	July 15	8¼	Cagliari, Ltd. . . .		30—32	..	5 3 1	149,900	10	July 1	5	Do. 5 p. c. Dbs. Red. .		100—103	..	4 17 1
100,000	10	Sep. 30	8	Cape Town & Dis., Ltd.		17—18*	+1	4 8 11									
50,000	50	May 3	6	Do. 6 p. c. 1st Mort.		60—61	+½	4 18 5					WATER COMPANIES.				
550,000	Stk.	Apl. 9	13½	Commercial Old Stock .		345—350	..	3 17 1									
196,483	,,	,,	10½	Do. New do.		258—263	..	3 19 10	746,159	Stk.	June 29	10½	Chelsea, Ord.		337—342	..	3 1 5
196,309	,,	June 11	4½	Do. 4½ p. c. Db. do.		155—158	..	2 16 11	150,000	,,	,,	5	Do. 5 p. c. Prf. . . .		177—180	..	2 15 6
800,000	Stk.	June 11	13	Continental Union, Ltd.		257—262	..	4 19 3	160,000	,,	,,	4½	Do. 4½ p.c. 1 f. Stk., 1875		157—160	..	2 16 3
200,000	,,	,,	10	Do. 7 p. c. Prf. .		217—222	..	4 10 2	175,785	,,	Sep. 30	4½	Do. 4½ p. c. 1 b. Stk. .		160—165*	..	2 14 6
51,000	Stk	Aug. 27	14	Croydon A 10 p. c. . .		315—320	..	4 7 6	1,720,560	Stk.	Apl. 9	7½†	East London, Ord. . .		230—235	..	3 3 10
163,400	,,	,,	11	Do. B 7 p. c. . .		252—257	..	4 5 7	654,740	,,	June 29	4½	Do. 4½ p. c. Db. Stk.		163— 66	..	2 14 3
535,000	Stk.	Aug. 12	5¼	Crystal Palace Ord. 5 p. c.		137—140	..	3 15 0	390,000	,,	,,	3	Do. 3 p. c. Db. Stk..		106½—107½	..	2 15 10
60,000	,,	,,	5	Do. 5 p. c. Prf. .		140—143	..	3 9 11	700,000	50	June 11	7½	G'd Junct'n, 10 p. c. max.		120—125	..	3 0 0
486,090	10	July 29	11	European, Ltd. . . .		27½—28½	..	4 3 0	195,000	Stk.	Sep. 30	4	Do. 4 p. c. Db. Stk.		147—152*	..	2 12 8
354,060	10	,,	11	Do. £7 10s. paid .		18—19	..	4 6 11	708,000	Stk.	Aug. 12	13	Kent		352—357	..	3 12 10
5,896,590	Stk.	Aug. 12	12¾	Gaslight & Coke, A, Ord.		316—319	..	3 19 11	160,000	,,	,,	7	Do. New, 7 p. c. max..		215—220	..	3 3 7
100,000	,,	,,	4	Do. B, 4 p. c. max.		113—118	..	3 7 10	1,043,800	100	June 29	9½	Lambeth, 10 p. c. max..		290—295	..	3 6 1
665,000	,,	,,	10	Do. C, D, E, 10 p. c. Prf.		317—322	..	3 2 2	406,000	100	,,	7½	Do. 7½ p. c. max..		223—228	..	3 5 9
30,000	,,	,,	5	Do. F, 5 p. c. Prf. .		150—155	..	3 4 6	350,000	Stk.	Sept. 30	4	Do. 4 p. c. Db. Stk.		147—150*	..	2 13 4
60,000	,,	,,	7½	Do. G, 7½ p. c. do. .		220—225	..	3 6 8	500,000	100	Aug. 12	13	New River, New Shares		448—453	..	2 17 4
1,300,000	,,	,,	7	Do. H, 7 p. c. max. .		203—208	..	3 7 4	1,000,000	Stk.	July 29	4	Do. 4 p. c. Db. Stk.		151—154	..	2 11 11
463,000	,,	,,	10	Do. J, 10 p. c. Prf. .		317—322	+2	3 2 2	902,300	Stk.	June 29	5	Southw'k & V'xhall, Ord.		161—164	..	3 0 11
476,000	,,	,,	6	Do. K, 6 p. c. Prf. .		180—185	..	3 4 10	126,500	100	,,	5	Do. do. 7½ p. c. max. .		151—154	..	3 4 11
1,061,150	,,	June 11	4	Do. 4 p. c. Db. Stk. .		138—141	..	2 16 9	489,200	Stk.	,,	5	Do. do. 5 p. c. Prf. .		173—178	..	2 16 2
294,850	,,	,,	4½	Do. 4½ p. c. do. .		156—159	..	2 16 7	1,019,585	,,	Apl. 9	4	Do. 4 p. c. A Db. Stk.		145—148	..	2 14 3
908,000	,,	,,	6	Do. 6 p. c. do. .		207—212	..	2 16 7	1,155,066	Stk.	June 11	10	West Middlesex . . .		315—320	..	3 2 6
70,000	10	May 13	8	Hongkong & China, Ltd.		14—15	..	5 6 8	200,000	,,	,,	4½	Do. 4½ p. c. Db. Stk.		163—166	..	2 14 3

*Ex div.

† Nett dividend will be at this rate.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The stronger position in the coal trade reported last week is being fully maintained; but representatives of many of the collieries are talking of some more definite advance, if possible, with the commencement of November. Any further upward move must, however, depend very much upon circumstances; and these at present—with the prospect of the dispute in the engineering trades now resolving itself into a protracted struggle between the employers and the Trade Unions—are certainly not favourable to any higher prices in the coal trade, while the probability that there may be a serious wages dispute in the cotton trade must have a still further detrimental effect upon the prospects of colliery properties in this district. The better qualities of round coal are moving off more steadily; orders keeping pits generally on full time. There has been no difficulty in getting the full list rates to which prices were levelled up at the commencement of the month; while in some instances prices even slightly above those ruling last year are being obtained. At the pit mouth, best Wigan Arley is quoted at 10s. 6d. to 11s. per ton; Pemberton four-feet and seconds Arley, 8s. 6d. to 9s.; and common house coal, 7s. to 7s. 6d. The lower qualities move off but very indifferently for steam and forge purposes; but with a good deal of common coal being taken away for domestic requirements, prices are fairly steady at about 6s. to 6s. 6d. per ton at the pit for ordinary steam and forge coal. Engine fuel is more plentiful; and for present delivery there are sellers here and there who would give way slightly on late rates. But general quotations are unchanged; and for forward delivery, colliery owners would not make any concession. Common slack averages 3s. to 3s. 6d. per ton at the pit; medium, 3s. 9d. to 4s. 3d.; and best sorts, 4s. 6d. to 4s. 9d. The shipping demand is active, and prices show an improvement; 7s. 9d. to 8s. per ton being obtained for ordinary steam coal delivered at the Mersey ports or on the Manchester Ship Canal.

Northern Coal Trade.—There has been an enlarged shipment of coals from most of the Northern ports in the last week; and thus work at the collieries has been generally full. In the steam coal trade, however, forward orders are not now so plentiful as they were; and the prices are therefore much easier. Best Northumbrian steam coals are 8s. 4½d. per ton f.o.b.; second-class, 8s.; and steam smalls, 3s. 6d. Gas coals seem slowly increasing in price, though much of the delivery is on old contracts at low rates. For occasional cargoes, 8s. per ton f.o.b. has had to be paid to secure delivery; and for any new contracts now in the market, it is expected that rates will be generally 6d. per ton above those of the contracts that will expire with the year. Manufacturing coals are very abundant; the extension of the engineers' strike having limited the use of this class of fuel. Gas coke is in larger supply, but seems to be more in use for domestic purposes, at unaltered prices.

Scotch Coal Trade.—The market continues to be well supplied with coal; and the demand does not fall off. There is a greater request for steam coal; and splint also moves off very freely. The shipping trade is more than usually active. So far as can be seen, the engineering dispute has not affected either the output or the demand for coal; and the miners, convinced of the futility of asking an advance of wages at present, are working steadily. The prices quoted f.o.b. Glasgow are: Main, 7s. per ton; ell, 7s. 6d. to 7s. 9d.; and splint, 7s. 6d. to 7s. 9d.—all the same as last week. The shipments for the week amounted to 192,773 tons—an increase of 42,759 tons over the preceding week, and of 29,393 tons over the corresponding week of last year. For the year to date, the total shipments have been 6,096,898 tons—an increase upon the same period of last year of 264,763 tons.

Incandescent Gas v. Electric Lighting at Oxford.—The Oxford City Council decided last Tuesday to light the whole of the city, except the present electric lighting area, with incandescent gas-lamps. The number will be about 1250. The offer of the Gas Company, which was accepted, was to convert all the existing ordinary lamps to the incandescent system free of charge, and to maintain them for £3 3s. 6d. each per annum. They advised the erection of 150 and 300 candle Denayrouze lamps at various points; and to this the Council agreed. The lighting of the city will be increased 400 per cent., at a cost of something more than 4½ per cent. The offer of the Electric Light Company was to erect 88 additional arc lamps, displacing 130 gas-lamps, the Council to pay £3091 for all standards and fittings, as well as for surface repairs after cables were laid—being a further outlay of £400; the price of the current for the whole of the lamps to be £1628 per annum.

Dorking Gas Company.—The half-yearly general meeting of this Company was held on the 28th ult; the Deputy-Chairman (Mr. W. T. Butler), presiding, in the absence, through illness, of Mr. J. Young, the Chairman of the Company. The Directors reported that, after providing for the interest on the debenture stock, there was a balance available for division of £2485. They recommended the payment of dividends at the rate of 10 per cent. on the "A" and "B" shares, and 7 per cent. on the "C" shares, which would absorb £813, and leave a balance of £1672, to be carried forward, as compared with £1620 in the previous half year. They also reported a satisfactory increase of 1,005,000 cubic feet, or 7·29 per cent., in the consumption of gas, due to additional consumers and stoves. The Overseers having increased the assessment of the Company's works, the Directors had decided to appeal against the increase, as they were advised it was not justified by the accounts; and, further, the rates on the new assessment, if confirmed, would be equal to a charge of 3d. per 1000 cubic feet on the gas sold, which was 50 per cent. in excess of that paid by the London Companies. The manufacturing operations during the past half year (under Mr. S. Carpenter's supervision) had been satisfactory; and the illuminating power and purity of the gas had been fully maintained to the requirements of the Company's Act. The Chairman remarked that the increased output of gas in the half year quite confirmed the action of the Directors in providing additional plant. This was now in a fair way to be completed; and before the winter came on they hoped to have it in working order. It was satisfactory to all concerned to know that in fourteen years the Company had doubled their output. The report was adopted.

RICHMOND & CO., LTD.

Works: STRATFORD, E., and WARRINGTON.

Show-Rooms: 132, QUEEN VICTORIA STREET, E.C. and ACADEMY STREET, WARRINGTON.

THE

"Brighton"

No. 1440 - - - - 25s. 0d.

,, 1440 C.D. & Tap - 28s. 6d.

A VERY HOT AND HANDSOME FIRE.

BEST STOVE ENAMEL FINISH.

New Purifiers at the Montrose Gas-Works.—Last Wednesday, at the invitation of the Manager of the Montrose Gas Company (Mr. T. Douglas Hall), Mr. A. Dickson, the Chairman, and Mr. Muirden, the Convener of the Works Committee, visited the works, and after inspecting them, turned on four new purifiers which had been connected earlier in the day. They are each 15 feet square and 4 ft. 6 in. deep, with three trays—two of lime and one of oxide. The connections are 12-inch, with Walker's patent dry centre-valve, working three purifiers on and one off or all four on. The lifting gear is hydraulic. The Contractors for the purifiers were Messrs. Henry Balfour and Co., Limited, of Leven, Fife; and the whole work reflects much credit on them. The old purifiers which are now thrown out of action are 8 ft. by 12 ft., by 3 ft. deep; and if the new ones give results in comparison with their size, it will almost be a case of purification in closed vessels. The last of the old purifiers changed had been in use 95 days, and had passed 4½ million cubic feet of gas. Lime and oxide are used in each purifier.

Nuneaton and the East Warwickshire Water-Works.—In connection with the purchase of the East Warwickshire Water-Works by the Nuneaton District Council, the latter body had before them last Wednesday a report by the Water Committee dealing with a statement showing the sum due to the Company. The Committee recommended the Council to accept the figures mentioned in the statement, which gave the amount to be paid in cash as £8259; being the sum over and above the redeemable bonds issued to the shareholders by the Council for £23,600. [Some explanation of these figures will be found in the last volume of the JOURNAL, p. 144.] The Committee had also had under consideration the amount required to be borrowed for the water undertaking; and they advised the Council to borrow, irrespective of the costs of the Act, £10,000—£5400 repayable in fifty years, and £4600 repayable in sixty years. The Committee further recommended that the Town Surveyor be instructed to prepare an estimate and plans for a new reservoir at the pumping-station at Stockingford, capable of holding 500,000 gallons. The recommendations were adopted.

Cost of Fixing Hired Gas-Stoves at Manchester.—A resolution has been passed by the Manchester Corporation Gas Committee, providing that, inasmuch as the charge for fixing gas-cookers seriously interferes with their use, and prevents the promotion of the business, in future the cost of fixing cookers taken out on hire shall be borne by the Committee; the hirer being charged 10 per cent. per annum on the cost of fixing, the same as is now charged on the cost of the cooker. Calling attention to this resolution at last Wednesday's meeting of the Council, Mr. Wilson declared that the Corporation had taken away the trade in gas-stoves from the tradespeople; and this was a further blow aimed at them. Alderman Gibson, in reply, stated that the Committee did not propose to do the work with their own men. The proposal of the Committee would obviate a great deal of inconvenience that had been felt in connection with the uncertainty as to the cost of fixing the stoves, and would inflict on tradespeople no such hardship as Mr. Wilson indicated. He had information that many Manchester firms were doing a large trade in gas-stoves. The resolution was confirmed.

Swansea Gas Company.—The report submitted by the Directors of this Company at the ordinary meeting on the 1st inst. stated hat the consumption of gas had increased by 3½ per cent. during the half ear ending June. The gross profit amounted to £5342; and, adding it to the amount standing to the credit of the profit and loss account, made £8964. After deducting from this the interest on debentures, there remained a sum of £8085 available for dividend. The Directors recommended the usual dividends for the half year; leaving £3035 to be carried forward. The Chairman (Mr. Travers Wood) said he considered the accounts very satisfactory, although the increase was slight as compared with former years. This was attributed to the closing of various works in the district. The expenses were less than those of the corresponding half of last year; while the receipts showed an increase of £1237. During the year, 417 new consumers had been connected, which was equal to an increase of 9 per cent. The Directors had in contemplation the introduction of coin meters; and they trusted there would be a large increase of consumers in cottage property throughout the district. They also looked with confidence to a continued extension of the use of gas cooking-stoves. All the manufacturing plant was in thorough repair; and the works were, if required, in a position to produce and store 75 per cent. more gas than was sent out last year with very little expenditure. The report was adopted; and the usual votes of thanks were passed to the Chairman and Directors and to the Manager (Mr. Thornton Andrews).

Sales of Shares.—At a recent sale by auction, three original £10 shares in the Eastbourne Gas Company realized £34 each; five similar shares, £34 10s. each; and another five, £35 each. Nine £10 "C" shares, fully paid, were also disposed of; six fetching £35 each, and the other three realizing £35 10s. apiece. Eight £10 "B" shares were knocked down at £27 10s. each; a similar share realizing £28. Two £25 shares in the Hastings and St. Leonards Gas Company were sold for £82 each; one similar share fetching £80. Two £20 shares were knocked down for £50 and £52 respectively. Several lots of £20 of consolidated original stock of the Lewes Gas Company were disposed of for £46 and £48 apiece; £15 of the same stock realizing £44. Some fully-paid £5 shares in the Uckfield Gas Company fetched £26 and £28 each. Four original £25 shares in the Lewes Water Company were sold at £82, £84 (two), and £86. Five £25 shares were also disposed of—one for £56 and four for £58 each. A new £25 share on which £20 had been paid was sold for £54. A similar share, and 22-55ths of one on which £17 12s. had been paid, realized £100. One original £25 share fetched £86; and a similar share, and 16-25ths of a new share on which £12 16s. had been paid, were knocked down for £118. A £20 lot of 5 per cent. preference stock was sold for £33. Messrs. Alexander, Daniel, and Co. offered for sale by auction last Friday £15,000 of the Bristol Water Company's 7 per cent. maximum consolidated ordinary stock. There was a spirited competition; the prices ranging from £155 10s. to £158 15s. per cent., or an average of £157 2s. 6d. The total amount realized by the sale was £23,464 5s. Last Tuesday, Mr. I. Race sold by auction £870 of new shares (7 per cent.) in the Tonbridge Water Company, at from £8 to £8 5s. per £5 share. The amount realized was £1402.

NEW PATTERN.

No. B 3846 30/- B 3847 37/6.

GAS-FIRE SEASON 1897-98

BEFORE ORDERING, SEE OUR

NEW DESIGNS.

UNEQUALLED,

UNAPPROACHED, AND

WITHOUT IMPERFECTION.

LISTS, ON APPLICATION, FROM

JOHN WRIGHT & CO. LIMITED,

BIRMINGHAM & LONDON.

The oldest and largest Gas-Stove Makers in the World.

Reductions in Price.—The Carnarvon Town Council last Tuesday agreed to a proposal of the Gas Committee that the charge for gas should be reduced 3d. per 1000 cubic feet. The price is now 4s. gross, with discounts of 6d. for lighting and 9d. for other purposes. This is the second reduction of 3d. made since the appointment of Mr. Harry D. Duesbury as Manager of the works in March, 1896. On the recommendation of the Gas Committee, the Newtownards Town Commissioners have decided to reduce their charge from 4s. 2d. to 3s. 9d. from Nov. 1. The Barry District Council have reduced the price of gas from 4s. 2d. to 3s. 9d. per 1000 cubic feet, less 10 per cent. discount. At a meeting of the Dalton Gas Committee last Wednesday, it was resolved to reduce the price of gas from 3s. 4d. to 2s. 11d. per 1000 cubic feet.

Water Scheme for Westbury.—The Westbury District Council are proposing to carry out a scheme of water supply, at a cost of £8000; and an application has been made to the Local Government Board to borrow this sum. Colonel J. T. Marsh has held the usual inquiry. He was informed by the Clerk of the Council (Mr. J. Callaway) that the population of Westbury and Dilton Marsh was 4559, and the rateable value £18,156. The source of the supply and the reservoir were both within the parish; and the sites of the well and reservoir and public easement were on property belonging to Lord Ludlow, with whom the Council had entered into a provisional agreement to purchase them at £500, subject to the scheme being passed by the Local Government Board. The purity of the water was certified by the County Analyst in 1895; and the Council were satisfied, from the experimental borings of their Surveyor, that there was a sufficiency of water to supply the district. After hearing the evidence, the Inspector visited the well.

Northam Water Supply.—The Northam District Council held a special meeting recently, at which the resolution approving of Mr. Baldwin Latham's scheme for supplying the district with water was confirmed. A meeting of the ratepayers was subsequently held to sanction the application to Parliament. Mr. Latham addressed this meeting, and explained that he had rejected a number of sources of supply either because the yield was insufficient or on account of the cost of pumping. At Melbury Moor they had a source of the purest water, ample for all purposes. He proposed to construct a reservoir to hold 26 million gallons, and it was intended to provide filter-beds and a covered service reservoir. The water would be conveyed by gravitation to the highest part of Northam by a 6-inch main. Allowing £1000 for an unopposed Act of Parliament, the cost was estimated at £25,000; and Parliament would give 60 years for repayment. If they borrowed the money at 3 per cent., the annual cost for principal and interest would be £903, or £1002 at 3½ per cent. The rainfall at Melbury averaged 42 inches; and the hardness of the water was not 7°. If they adopted the Pimpley scheme, the cost would be about £15,000, and as they would only get 30 years for the repayment of the money, it would take £765 per annum, besides which pumping would cost £350 and softening the water £250—a total annual outlay of £1365. Two or three of the ratepayers expressed the opinion that the scheme was too costly for the parish; but the resolution approving it was carried by a majority of three to one.

Stokers' Work and Wages.—At the meeting of the Blackburn Town Council last Thursday, the proceedings of the Gas Sub-Committee in regard to the stokers' work and wages came up for consideration. It will be remembered that the men applied for an eight-hour day, and a week's holiday every year, with pay. The Sub-Committee appointed to deal with the matter presented the following suggestions: (1) Stokers to carbonize in the old retorts 2 tons 16 cwt. of coal, at 5s. 4d. per shift of eight hours; each wheeler to assist two stokers to put down coal and wheel away surplus coke, &c., at 4s. per shift. (2) Stokers to carbonize in the new retorts 3 tons 6 cwt. of coal at 5s. 4d. per shift; each wheeler to receive 4s. 6d. per shift, and each fireman to attend to five fires at 5s. per shift of eight hours. (3) The men's request for a week's holiday with pay not to be acceded to. These suggestions were confirmed. The Oldbury Gas Committee have granted their stokers an increase of 5 per cent. in their wages in certain cases; and have arranged satisfactory terms with them in regard to Sunday labour.

West Gloucestershire Water Company.—Steady progress is again shown by the report of the Directors of this Company. During the half year ending Aug. 28, 268 additional services were laid; making the number of houses and other properties supplied 5940, which, with some meter and miscellaneous supplies, are estimated to produce a rental of £5349 per annum. This is an increase of £803 during the half year, including a substantial guarantee payable by the Great Western Railway Company in connection with an extension of the water-mains to Old Sodbury. The Directors further state that additional shares have been allotted at par to the extent of £10,830. The accounts for the half year show that, after paying all working expenses and interest on debenture stock, &c., there is a net profit of £1159, which, together with £84 brought forward, makes a total of £1243 to the credit of the revenue account. From this balance a dividend at the rate of 3 per cent. per annum was declared at the recent meeting of the Company. The shareholders also sanctioned the issue of 1306 shares of £10 each—part of the additional capital of £60,000 which the Company are empowered to raise under their Act of 1887.

Increased Storage at the Tonbridge Water-Works.—In view of the serious outbreak of typhoid fever at Maidstone, in consequence of the pollution of part of the water supply, it is satisfactory to find that the underground store from which the supply to the neighbouring town of Tonbridge is derived—a natural filter-bed in the gravel strata—is absolutely safe from the possibility of contamination. The Directors are now engaged in extending their storage by the construction of a reservoir from the plans of their Manager and Secretary (Mr. J. Lees), under whose supervision the plant has been almost entirely re-modelled. The new reservoir, which will be finished by the Contractor (Mr. R. Langridge) in about two months, will be 22 feet deep, and will hold 260,000 gallons; taking the place of one of a capacity of 120,000 gallons. The concrete wall is being formed with the gravel taken from the site; being 4 feet thick at the bottom and 2 feet at the top. In the lower part of this wall there are something like 150 apertures to admit of the filtered water flowing into the reservoir. The pillars for supporting the arches of the roof will be constructed of white glazed bricks; and the top will ultimately be covered with earth, and ornamented with flower-beds.

CARBURETTED WATER-GAS APPARATUS

MERRIFIELD—WESTCOTT—PEARSON PATENTS.

THE

ECONOMICAL GAS APPARATUS CONSTRUCTION Co., Ld.

W. H. PEARSON, Chairman.
W. H. PEARSON, Junr., Deputy-Chairman.
J. T. WESTCOTT, M.E., Manager.
L. L. MERRIFIELD, M.Inst.M.E. Engineer.

London Offices: 19, ABINGDON STREET, WESTMINSTER, S.W.
American Offices: TORONTO.

TELEGRAPHIC ADDRESS: "CARBURETED, LONDON."

Carburetted Water-Gas Engineers.

The Complete Plant for the

BIRMINGHAM CORPORATION

WILL HAVE A

GUARANTEED DAILY CAPACITY OF 8 MILLION CUBIC FEET,

AND A

MAXIMUM CAPACITY OF 10 MILLION CUBIC FEET.

An Illustrated Advertisement of the Plant will appear next week.

The Recent Failure in the Water Supply at Southampton.—The Water Engineer of the Southampton Corporation (Mr. W. Matthews, M.Inst.C.E.) has reported to the Works Committee of the Town Council upon the recent failure in the water supply, mentioned in the "JOURNAL" a fortnight ago. It appears that a new 24-inch main had been laid from Otterbourne to Swaythling, and the supply through an old 16-inch main, running parallel with it, was being duplicated. Mr. Matthews had put in a number of connections between the two; the object being to enable him, in case any accident occurred, to divert the water from one main to the other, or deal with any section of either main. It appears that the Clerk of the Works, who had had charge of the construction of the 24-inch main, wished to put in the connections to the 16-inch main; and in order to do so he opened the wash-out at Monk's River, near Swaythling, as he thought to drain the 16-inch main, in order to put in the valve more efficiently. But he was not aware that the valve he opened connected the two mains. The effect of his action was that he not only emptied the water out of the 16-inch main, but also drew the large quantity of 1¼ million gallons from the 24-inch main, and lowered the water in the Otterbourne reservoir. The result was that air rushed into the 24-inch main; and when the Superintendent of the works at Otterbourne wished to go on with his pumping, he found he could get little water to pass out, owing to the air-lock. Mr. Matthews investigated the matter; and, after much trouble, he was able to locate the difficulty, and bring the 16-inch main into work.

Contemplated Large Water Scheme for Derbyshire.—At the last meeting of the Matlock Urban District Council, an important letter, disclosing a very extensive county water scheme, was read. It was from Mr. Joseph Pym, the Clerk of the Belper District Council, who asked for the co-operation of the Matlock and other Councils in a water project. It stated that considerable sums had been spent in experiments in searching for water in Derbyshire, and a combination of various authorities was proposed. His Water Committee suggested that it was common knowledge that Chesterfield in the north, and authorities south, east, and west, were searching for permanent water supplies; but their efforts were much hampered by coal mines, which were constantly extending, and by old mines. The Committee added that they were aware the Council had no power to promote a Bill in Parliament, and a combination of authorities to promulgate a comprehensive scheme from the great supplies of excellent water from the northern part of the county, was desirable. The expense of a thorough scheme would be too great for one Council, but if spread over a number it would not be prohibitive, and at the same time it would be preferable to continuing the present isolated efforts. The letter stated: "We would further suggest the necessity for prompt action, because efforts are now being made in Nottinghamshire, and plans have been prepared for a comprehensive scheme for taking waters from the Peak lands in Derbyshire, to supply large districts in Notts." It was hoped the Derbyshire County Council would protect the interests of their own county in this matter. If the supply were once taken away, it would be an irreparable loss to the county, and also to the borough of Derby, which recently deposited plans for acquiring one large source. It was decided to support the proposition.

Typhoid Fever and Water Supply.—The distressing results attending the distribution of polluted water which are now being witnessed at Maidstone have created alarm all over the country as to the possible repetition of the trouble in other towns. Questions as to the quality of the water supply have been put to the officials of various local authorities; and their replies have, as far as we have seen, been of a reassuring nature. It was a great mistake on the part of the old Local Board of Maidstone to determine to have only quarterly analyses of the water; while those made for the Water Company might certainly have been more frequent. However, good will come out of evil if greater attention is given in the future to the question of the periodical analysis of water. A weekly test would not entail much expense, and it would help to prevent such an epidemic as that with which the county town of Kent has been visited. Though attempts have been made to get up a scare in London, we pointed out last week that, in view of the vigilance with which the water supply is looked after, it would be almost impossible for contamination to exist without prompt detection. Apart from the official analysts, the Medical Officers of Health of the various local authorities keep a sharp look-out. Mr. Wynter Blyth reports monthly to the Marylebone Vestry on the quality of the water supplied to the parish; and doubtless similar reports are furnished in most other cases. The Vestry of St. James's, however, do not appear to have been in line with their neighbours on the north-west; for at their meeting last Thursday they passed a resolution authorizing their Medical Officer (Dr. J. Edmunds) to make periodical analyses of samples of water drawn from the mains of the various Companies supplying the parish, and to report the results monthly. Instructions have also been given at several places in the provinces to have the water tested.

Messrs. Kirkham, Hulett, and Chandler, Limited, have received an order from the Barking Gas Company for a patent "Standard" washer-scrubber, a Marshall patent tar extractor, and a Marshall battery condenser. The firm have recently completed the erection of one of their washer-scrubbers, together with a Marshall tar extractor, at the gas-works of the Ramsgate Corporation.

Messrs. Henry Greene and Sons, of 155, Cannon Street, have been appointed agents and sole representatives for London and the South of England of Messrs. W. R. Clay and Co.; and in conjunction with this firm's anti-vibratory fitting for incandescent burners Messrs. Greene are introducing Talbot's patent bye-pass tap, which was described in our "Register of Patents" on Dec. 29 last year.

Our readers will probably have noticed from our advertisement columns during the past few weeks that Mr. Alfred Richards will resume his sales of gas and water stocks and shares on the 19th inst. He will then offer for public competition 500 shares in the Southend Water Company, a small parcel of shares in the Southend Gas Company—both new issues, by order of the Directors—as well as stocks and shares in the South Metropolitan, Uxbridge and Hillingdon, New Swindon, Portsea Island, and other Companies.

The first statutory meeting of Messrs. Hutchinson Brothers and Company, Limited, was held at the registered offices in Barnsley on the 28th ult., when it was decided that the prospectus should shortly be issued, and the public invited to subscribe the necessary capital to develop a new departure in automatic gas-meters. The Company claim to have the simplest and only purely automatic prepayment gas-meter so far constructed; and they also take over the old-established Falcon Meter Works as a going concern.

A complete installation of the Arrol-Foulis stoking plant has lately been put up at the Bolton Gas-Works, under the supervision of the Engineer (Mr. W. Smith). The machinery consists of two drawing and two charging machines, and a double set of elevators, coal-breakers, and conveyors, with the necessary engines and hydraulic pumps. The plant has recently been started, and is giving every satisfaction. At the Linacre Gas-Works, Liverpool, where the Arrol-Foulis system of stoking has long been used, considerable extensions to the existing plant have just been made. Four charging-machines have been added to one of the retort-houses where previously only the drawing-machines were in use; and in another house two charging-machines, and a double set of elevators, coal-breakers, &c., have been installed, so as to be ready for the coming winter.

We have received the new complete list, dated September, 1897, of Messrs. Richmond and Co., Limited. It is a most creditable production, well got up throughout, and neatly bound. Six phototype views of their Warrington works give some idea of the progress the firm have made in the seven years they have been established. Their Stratford works, it is stated, will begin to supply very shortly. Several coloured plates, illustrating their leading lines, and two folded sheets giving scale photographs of their various slot and best-grade cookers, add to the attractiveness of the list. There are many new patterns which will doubtless add to the firm's reputation, among others a new slot-meter cooker (p. 5) and griller (p. 34), large hotel cookers, with double ovens (pp. 26-7), large "Dragon" condensing stove (p. 58A), large "Monarch" hall stove (pp. 62-3), the "Louis XIV." luminous-flame drawing-room stove (p. 66B), and a large fire—which Messrs. Richmond claim to be the largest yet made—the "Neptune" (p. 66A), with 18-inch fire opening, and several special features.

Messrs. Fletcher, Russell, and Co., Limited, have lately been adding new designs to their already large assortment of heating and cooking apparatus. Foremost among them is a novelty in flueless warm-air stoves, for use in such places as halls, lofty apartments, or shops. This new stove has been named the "Fireglow;" and its special feature is that, instead of bunsen burners being placed underneath ball fuel in the ordinary way, illuminating burners are fixed above the fuel, which, as well as the back and bottom interior of the casing, is painted red. The effect of this is that, when the burners are alight, the reflection from them causes the painted fuel to closely represent an incandescent gas-fire. The fuel itself remains practically cold; the heat being emitted from the top of the stove. The cheerful appearance which the arrangement possesses will be a strong recommendation to its adoption in preference to the somewhat sombre-looking warm-air stove of the past. A compact and serviceable piece of apparatus for use in hotels and restaurants is the new "Piano" grill, the top part of which somewhat resembles the instrument mentioned. It is 2 ft. 6 in. wide, 2 ft. 6 in. deep, and 3 ft. 10 in. over all; the available grilling space being 2 ft. wide and 1 ft. 3 in. deep. It is capable of cooking about twenty chops at the same time. The burners are fixed above the grill, which can be placed at any desired level; and within the stand underneath provision is made for the disposal of plates, &c.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

JOHN WM. O'NEILL, Managing Director, Palmerston Buildings, Old Broad Street, London, E.C.

ANDREW STEPHENSON, AGENT. All communications *re* Oxide to be addressed to Palmerston Buildings.

WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 300 British Gas-Works.

ANDREW STEPHENSON,
182, GRESHAM HOUSE,
OLD BROAD STREET,
LONDON, E.C.

Telegrams: "Volcanism, London."

J. & J. BRADDOCK, Globe Meter Works, Oldham.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

Telegraphic Address: "Braddock Oldham."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.

Telegraphic Address: "PORTER LINCOLN."

[For Illustrated Advertisement, see Oct. 5, p. 758.]

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality. SPECIAL FIRE CEMENT, OXIDE PAINTS, OILS, SULPHURIC ACID, &c.

120 and 121, NEWGATE STREET, LONDON, E.C.

Telegrams: "BOGORE, LONDON."

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.

Before placing Orders, please write for Estimate.

PATENTS FOR INVENTIONS.

J. C. CHAPMAN, M.I.M.E., and Fel. Chartered Inst. Patent Agents. ADVICE ON ALL MATTERS CONNECTED WITH ABOVE. Information and Handbook on application.

70, CHANCERY LANE, LONDON, W.C.

GWYNNE & BEALE'S

PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 65,095. Holborn.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

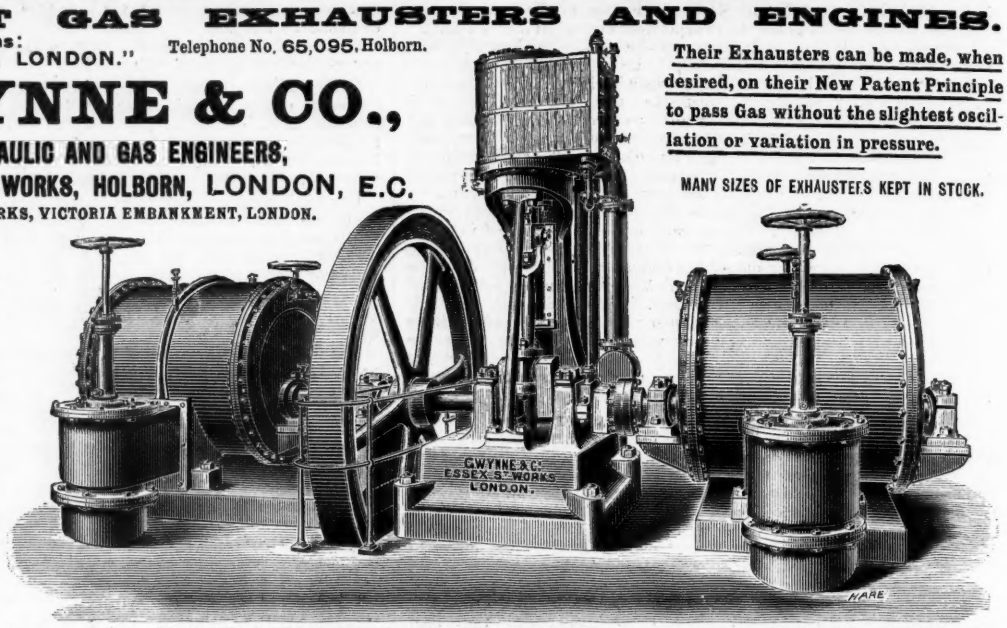
BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 36,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK.

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.

Catalogues and Testimonials sent on application.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

AMMONIACAL LIQUOR wanted.
BROTHERTON AND CO., Ammonia Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

GAS TAR wanted.
BROTHERTON AND CO., Tar Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SPENT OXIDE wanted.
BROTHERTON AND CO., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SULPHURIC ACID for Sale.
BROTHERTON AND CO., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

Price 2s., Post Free.

STEPHEN CARPENTER, on the Purification OF COAL GAS BY LIME, OXIDE OF IRON, AND ATMOSPHERIC AIR, and the Method of Working Purifiers so that the Lime may be used a second time, with a Description of Carpenter's short Method of Working off the Sulphur Test, and Table for Calculating Results.
S. CARPENTER, Ryde House, 28, Woodhouse Grove, East Ham, Essex.

GAS Companies in Formation, Local Bodies, &c., desirous of LIGHTING THEIR DISTRICTS, may have VALUABLE INFORMATION by preliminarily consulting the Advertiser.
Address, in first instance, No. 2920, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Improver in Gas-Fitting. Used to Mains, Service Laying, and House Fitting. Age 20.
Apply 27, Church Street, St. Albans, HERTS.

WANTED, a Situation as Improver in GAS-FITTING. Four Years' Experience. Used to Compo. and Iron Fitting and Meter and Stove Fixing. Age 20. Can be well recommended.
Apply, care of MANAGER, Gas-Works, OAKHAM.

TO GAS ENGINEERS AND MANUFACTURERS.

GENTLEMAN, with extensive experience in Gas Engineer's and Manufacturer's Office, and accustomed to Travel, is open to ENGAGEMENT. Could introduce first-class connection among Gas Companies.
Address No. 2926, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SADLER & CO., Ld., Middlesbrough; ULVERSTON (BARROW); PORTSMOUTH; CARLTON (N.E.R.); and STOCKTON. Tar and Petroleum Distillers. Benzol and Petroleum Spirit, 700 and other Gravities specially prepared for Carburetting. SOLAR OIL for Gas Making, Kerosene, &c.
Correspondence invited.
Telegraphic Address: "SADLER, MIDDLESBROUGH."

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1769.

OXIDE OF IRON.

BOG ORE.

BLACKWELLS' celebrated Oxide.
Purity and Uniformity of Quality unequalled.
OFFERS of SPENT OXIDE wanted.
GEO. G. BLACKWELL, SONS, AND CO., Mine Proprietors, The Albany, LIVERPOOL.

IMPORTANT.

OLD Retorts made equal to new by repairing them with CROWTHER'S PATENT STICKFAST FIRE CEMENT. Unequalled for Repairing Inclines. Can be used in Hot or Cold Retorts; and "A1." for Mouthpiece Joints. Satisfaction Guaranteed.
CROWTHER, Practical Retort Setter, Manor Street, HUDDERSFIELD.

WANTED, by a good all-round, handy man a Situation as MANAGER of a small Gas-Works, and to do repairs to Gas and Water Fittings, &c. Twelve Years with present employers. Good References. Age 30.
Address No. 2932, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS TRADE.

TRAVELLER Wanted, with connection among Gas Companies in the South and West of England.
Apply, by letter only, stating Age, previous Experience, and Salary required, to H. G. & S., 155, CANNON STREET, E.C.

WANTED, a thoroughly competent WORKING INSPECTOR for Incandescent, Public, and Private Lighting. Cyclist preferred.
Send full Particulars, *copies* of Testimonials, and Wages required to No. 2929, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Clerk of Works, who must be a good Draughtsman, accustomed to superintend the Erection of Gasholders and Extensions, and able to take charge of the Works if required. House, Gas, and Coal provided.
Apply, stating Wages required, Age, and Experience, to No. 2933, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SULPHATE OF AMMONIA SATURATORS.

WALTER THOMASON and SONS,
Chemical Plumbers, &c., and Makers of Lead Saturators, &c., 21, WESTON STREET, BOLTON. Repairs of every description.
Please write for Estimate before ordering elsewhere.

CANNEL, COAL, ETC.

JOHN ROMANS & SON, EDINBURGH,
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application to No. 30, ST. ANDREW SQUARE, EDINBURGH, / NEWTON GRANGE, NEWBATTLE, DALKEITH, } SCOTLAND.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.
Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

WANTED, a Main and Service Layer.
One able to fix Stoves and Meters, and take states.
Apply, stating Age and Wages required, with References, to A. BIRD, Manager, Gas-Works, BROMSGROVE.

GENERAL Foreman wanted immediately for a Provincial Gas-Works, carbonizing about 20,000 tons per annum. Wages £2 per week, with House, Coal, and Gas. None but those having had thorough retort-house experience, the control of workmen, and whose character will bear the strictest investigation need apply.
Apply, by letter only in the first instance, stating present Employment (if any), Age, and giving two or three References as to Character and Experience, to No. 2930, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS CARBON Wanted, not less than 4-Ton Loads.
Apply to the BRIMINGTON CARBON COMPANY, Sowerby Bridge, YORKS.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. **Compare Prices and Particulars before ordering elsewhere.**
J. F. BLAKELEY, Gas Engineer, Ravensthorpe, YORKS.

GAS-PUMP for Sale, horizontal, one Steam Cylinder, 18-inch bore, and two Gas Cylinders, 17½-inch bore, all 24-inch Stroke, on massive Bed-Plate, with heavy Fly-Wheels. Very strong. First-Class Make. Not much used.

Apply, by letter, to No. 2878, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE — A Modern Sulphate of AMMONIA STILL, built by Messrs. R. & J. Dempster, Manchester, 1893, with separate Liming Compartment. Capacity, with ordinary Liquor, 5000 to 6000 lbs. of Sulphate per day.

For further Particulars, apply to the BRYMBO STEEL COMPANY, LIMITED, near WREXHAM.

PATENT FOR SALE.

THE Inventor of a Retort-Lid Fastening, which is well spoken of, and has met with a considerable measure of success, is anxious to dispose of his PATENT RIGHTS to a Firm of Manufacturers, or other Capitalists, for a Sum down or by Instalments, as may be agreed.

Full Particulars will be sent on application, by letter, to No. 2927, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

AMMONIACAL LIQUOR.

THE Rickmansworth Gas Company are prepared to receive OFFERS for about 30,000 gallons of 8, 10, or 12 oz. LIQUOR, in Contractor's Barrels by Rail, or Boats on the Grand Junction Canal.

Apply to the MANAGER, Gas-Works, Rickmansworth, HERTS.

CITY OF BELFAST.

CONTRACT FOR COAL.

THE Gas Committee of the Belfast Corporation invite TENDERS for a supply of 75,000 Tons of Best Screened GAS COAL, to be delivered free and trimmed in Barges at Belfast Harbour, between Nov. 15, 1897, and Nov. 30, 1898.

No tender for less than 10,000 Tons will be considered.

Monthly Quantities and Particulars may be obtained from the Manager of the Gas-Works.

Tenders, on Office Forms, endorsed "Tender for Coal," should be delivered at my Office not later than the 27th of October.

The lowest or any tender not necessarily accepted.

SAMUEL BLACK,
Town Clerk.

DEVON COUNTY ASYLUM.

SALE OF GAS-WORKS.

THE Committee of Visitors invite TENDERS for the purchase of their Gas-Works, consisting of: One TELESCOPIC GASHOLDER, 36 feet diameter and 24 feet high; one Stack of CONDENSING PIPES, comprising 32 Pipes, 9 ft. by 6 in., and Connections; one Bench of three and one Bench of two PURIFIERS; one SCRUBBER; three Benches of RETORTS (five each); HYDRAULICS, &c. The Brickwork is not included.

The whole must be removed at the expense of the Purchaser within three weeks of the acceptance of his Tender.

Tenders (of which the Committee do not bind themselves to accept the highest or any) must be sent to the undersigned on or before the 31st inst.

To view, apply to the Engineer at the Asylum, Exminster.

(Signed) ARTHUR E. WARD,
Solicitor, 9, Bedford Circus, Exeter,
Clerk to the said Committee.

Dated Oct. 8, 1897.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of the above Company will be held at the Offices of the Company, 30, Gracechurch Street, in the City of London, on Tuesday, the 2nd day of November, 1897, at Three o'clock in the afternoon precisely, to receive the Directors' Report and the Accounts of the Company for the Half Year ended the 30th day of June last, and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 20th of October to the 2nd of November, both inclusive.

By order of the Board,
SAMUEL WOOD,
Secretary.

Offices: 30, Gracechurch Street,
London, Oct. 5, 1897.

Now Ready, Price 10s. 6d.

WARNER'S DIAGRAMS
OF THE ANNUAL
AVERAGES OF PARLIAMENTARY RETURNS RELATING TO GAS UNDERTAKINGS,
1887 TO 1895.

Together with the Private and Public Undertakings Grouped—1895 and 1896 Workings.

COMPILED BY
W. J. WARNER, of South Shields.

These Diagrams, which were noticed in the "JOURNAL" for Aug. 24, 1897, may be had of WALTER KING, 11, Bolt Court, FLEET ST., E.C.

IMPERIAL CONTINENTAL GAS ASSOCIATION.
INCORPORATED BY ACT OF PARLIAMENT.

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Association will be held at the City Terminus Hotel, Cannon Street, London, E.C., on Tuesday, the 2nd day of November next, at 2.30 p.m. precisely, when a Report will be made to the Proprietors, a Dividend declared for the Half Year ended the 30th of June last, and the usual Ordinary Business of such Meeting transacted.

Notice is Hereby also Given, that the CAPITAL STOCK TRANSFER BOOKS WILL BE CLOSED from the 19th inst. to the 2nd prox., both days inclusive.

The Dividend will be paid on the 9th of November.

By order of the Board,
ROBERT W. WILSON,
Secretary.

21, Austin Friars, London, E.C.,
Oct. 11, 1897.

By Order of the Directors.

THE SOUTHEND WATER-WORKS COMPANY.

SALE OF 500 SHARES.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Tuesday, the 19th of October, at Two o'clock, in Lots, 500 £10 SHARES (to be issued as fully paid) in the above Undertaking, ranking for a Maximum Dividend of 7 per cent.; the Dividend to the 30th of June last on the same class of Shares being at the rate of 5¼ per cent. per annum.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SOUTHEND GAS COMPANY.

SALE OF SHARES.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, London, E.C., on Tuesday, the 19th of October, at Two o'clock, in Lots, 29 £10 SHARES in the Southend Gas Company, ranking for a Standard Dividend of 7 per cent.; the last Dividend on the same class of Shares having been at the rate of 7½ per cent.

Particulars of the SECRETARY, at the Offices, SOUTHEND, and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of Executors and other Owners.

GAS STOCKS AND SHARES
IN THE
SOUTH METROPOLITAN GAS COMPANY,
NEW SWINDON GAS COMPANY,
UXBRIDGE AND HILLINGDON GAS COMPANY.
PORTSEA ISLAND GAS COMPANY.
HENFIELD GAS COMPANY, LIMITED.

MR. ALFRED RICHARDS will Sell by AUCTION, at the Mart, E.C., on Tuesday, Oct. 19, at Two o'clock, in Lots, STOCKS and SHARES in the above Companies.

Particulars may be obtained of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

ISSUE OF STOCKS AND SHARES BY AUCTION UNDER PARLIAMENTARY POWERS.

MR. ALFRED RICHARDS undertakes the issuing by Auction of GAS AND WATER SHARES under Parliamentary Power.

He also holds MONTHLY SALES of GAS AND WATER SHARES at the Auction Mart, Tokenhouse Yard, E.C.

Terms for the issuing of Capital, and also for offering to auction Gas and Water Shares, and all Particulars relating thereto, may be had of Mr. Alfred Richards.

Offices: 18, FINSBURY CIRCUS, E.C.

BATTERSEA POLYTECHNIC, London, S.W.

DAY COURSES IN APPLIED CHEMISTRY FOR TECHNICAL STUDENTS.

Head of Chemical Department—W. A. BONE, D.Sc., Ph.D.

Special Day Courses of Instruction in EXPERIMENTAL CHEMISTRY as applied to GAS MANUFACTURE will be given during the ensuing Session, commencing Oct. 4.

The object of these courses is to impart a thoroughly scientific training in this special branch of Applied Chemistry; and they are especially suited for Youths who are preparing themselves for positions of responsibility in this particular Industry. The Laboratory is open daily.

Special Evening Courses for Artizan Students.

For PARTICULARS and PROSPECTUSES of other Schools and Classes, apply to the SECRETARY.

LONDONDERRY GAS COALS

FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.

Available output up to 5000 tons per day
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,
SEAHAM HARBOUR, COUNTY OF DURHAM.

Price 6s., *Cloth Bound,*

THE CHEMISTRY OF ILLUMINATING GAS.

By N. H. HUMPHRYS, Assoc M.Inst.C.E., F.C.S.

This work contains chapters on: The Relative Cost of Light from Gas, Oil, and Candles; Products of Combustion; The Sulphur Question; The Composition of Illuminating Gas; Water Gas; Various Gas-Making Processes; Oil Gas; Properties of Fluid Hydrocarbons; Tar for Gas-Making; Destructive Distillation Condensation; and Purification.

LONDON: Walter King, 11, Bolt Court, Fleet St., E.C.

THE WHOLESALE FITTINGS CO.,
37, COMMERCIAL ROAD,
LONDON, E.
(M. ALTMAN, Proprietor).
CHEAPEST HOUSE FOR
INCANDESCENT GAS-FITTINGS,
WHOLESALE AND EXPORT.
THE BEST BURNER IN THE KINGDOM
ONLY 6s. PER DOZEN.
Reduction for quantities; Cash with order.
Send for Price List.
Trams and 'Buses pass the Door.
Five minutes' walk from Aldgate Station

HEATHCOTE GAS COAL.

Rich in Illuminating Power and Yield of Gas.
Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.,
CHESTERFIELD.

THORNLEY GAS COALS
WORKED BY THE
WEARDALE IRON & COAL CO., LD.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON, *May 28, 1895.*

Yield of Gas per Ton	10,500 Cub. Ft.
Illuminating Power	16·9 Candles.
Coke (of good quality)	67·5 per Cent.
Sulphur	0·58 „
Ash	2·73 „

For Price, &c., apply to the
WEARDALE IRON & COAL CO., LD.
QUAYSIDE, NEWCASTLE-ON-TYNE.

BOGHEAD CANNEL
OR
TORBANEHILL MINERAL.

JAMES WOOD, LTD.,
Are the only Producers of the famous original
BOGHEAD CANNEL or
TORBANEHILL MINERAL.

F.o.b. or c.i.f. Prices on Application to
28, ROYAL EXCHANGE SQUARE,
GLASGOW.

METERS Limited.

A Company formed to amalgamate the Businesses of the following well-known

Gas-Meter Manufacturers.

J. & J. BRADDOCK,
Globe Meter Works, Oldham.

GEORGE ORME & CO.,
Atlas Meter Works, Oldham.

SAWER & PURVES,
Meter Manufacturers, Manchester.

THE AUTOMATIC GAS-METER (1895) CORPORATION, LIMITED,
Manchester,

With all the Patents appertaining to the above Businesses, including

BROWNHILL'S ORIGINAL PATENT FOR AUTOMATIC METERS,
and Patents for Improvements thereon;

also

BRADDOCK'S PATENTS, ORME'S PATENTS,
SAWER & PURVES' PATENTS, THORP & MARSH'S PATENTS,
HAYNES' PATENTS.

THE PROSPECTUS

will appear in our next issue.

"Invaluable to those engaged in lighting or water works."—ENGINEERING.

Just Published. Twenty-First Year of Issue. Revised and Enlarged.

GAS AND ELECTRIC LIGHTING DIRECTORY AND STATISTICS,

With List of Engineers, Managers, and Associations,

Price, Cloth, 6s.

WATER COMPANIES' DIRECTORY AND STATISTICS,

With List of Engineers, Managers, and Associations,

Price, Cloth, 6s.

THE TWO VOLUMES IN ONE, 10s.

LONDON: HAZELL, WATSON, & VINEY, LTD., 1, CREED LANE, LUDGATE HILL.

JAMES OAKES & Co.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation.

Yield of Gas Per Ton. . 11,205 Cubic Feet.
Illuminating Power, 16 7/10 Stand. Sperm. Candl.
Coke (of good & pure quality) 13¾ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash. . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton. . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . 13½ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar. . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 94½ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COALFIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,

HOLMSIDE AND SOUTH MOOR OFFICES,

NEWCASTLE-UPON-TYNE.

BOLDON GAS COALS.

ANALYSIS.

Yield of Gas per ton . . 10,500 Cubic Feet.
Illuminating Power . . 16·9 Candles.
Coke . . . . . 66·7 Coke.
Sulphur . . . . . 0·86 Sulphur.
Ash . . . . . 2·04 Ash.

For Prices, &c., apply to

W. H. PARKINSON,

THE HARTON COAL CO., LTD.,

NEWCASTLE-ON-TYNE.

Telegraphic Address: "PARKINSON NEWCASTLE."

THOMAS TURTON AND SONS, LIMITED,

SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY

FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

LONDON OFFICE:

90, CANNON STREET, E.C.

THE SILICA FIRE-BRICK COMPANY,

OUGHTIBRIDGE, near SHEFFIELD,

MANUFACTURE

SILICA BLOCKS, BRICKS, AND CEMENT

OF SUPERIOR QUALITY

FOR GAS-FURNACES.

Trade Mark: "SILICA."

These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their

GREATER DURABILITY,

Strongly recommended where EXCESSIVE HEATS have to be maintained.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on Application.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke. . . . . 68 per cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

THE WALLSEND & HEBBURN COAL COMPANY, LTD.

8 Lombard Street, NEWCASTLE-ON-TYNE.

W. RICHARDSON, Fitter.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE BOGHEAD CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 17·8 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,

COAL OWNERS, NEWCASTLE-ON-TYNE;

OR

E. FOSTER & CO.,

21, JOHN STREET, ADELPHI, LONDON, W.C.

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
Shipments Promptly and Carefully Executed.

London Office: R. Cull, 84, Old Broad St., E.C.

Telephone: Castleford No. 214. | Postal Address: Castleford.
Telegrams: "Silkstone Castleford."

THE SILKSTONE & HAIGH MOOR COLLIERIES, Ltd.
ALLERTON BYWATER, CASTLEFORD.

Steam, Manufacturing, & Gas Coals & Cannel
Analysis, Contracts, Trial Waggons, and Quotations for Large and Small Orders. Inquiries Solicited.

EVESON FOR CANNEL

Telegrams:
"EVESON, BIRMINGHAM."

E. ASQUITH & CO.,
Hydraulic Engineers,
17, Mather Street, Ancoats, Manchester,
Fit up Plants for
Pressing Anthracene, Naphthalene, &c.
Competent Men sent out to erect same. Estimates given.

NEWBATTLE CANNEL.
Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO
THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

UNEQUALLED.
Gas Companies are solicited to try Samples of the
MIRFIELD
BLACK BED GAS COAL.
Prices and Analysis on application.
MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

JOHN BROWN & CO., Ltd., SHEFFIELD.

Proprietors of
ALDWARKE MAIN, CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.

ALDWARKE MAIN GAS COAL

Analysis: 12,600 Feet of 19-Candle Gas per Ton.
Value in Pounds of Sperm, 820·80.
VERY FREE FROM IMPURITIES.

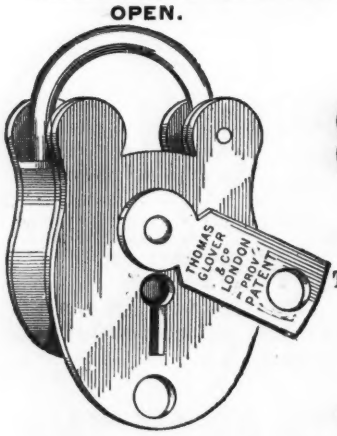
TELEGRAMS: "ATLAS, SHEFFIELD."

[ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.]

LONDON, 1851. NEW YORK, 1853. PARIS, 1855. LONDON, 1862. DUBLIN, 1865. PARIS, 1867.

THE SIX MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS;
The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.

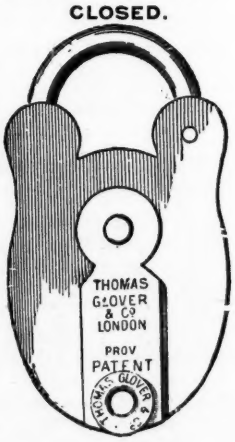
OPEN.



THOMAS GLOVER & CO.'S
PATENT
SECURE PADLOCK
Prevents Tampering with the
CASH-BOXES OF PREPAYMENT METERS.
The Padlock is Sealed by means of a Lead Eyelet, which is impressed with Company's private mark.
Eyelets easily fixed and removed by Company's Collector.

Telegraphic Address: "GOTHIC LONDON." Telephone No. 6725.

CLOSED.



THOMAS GLOVER & CO., LTD.,
DRY GAS-METER MANUFACTURERS,
214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

BRISTOL:
28, BATH STREET.
Telegraphic Address: "GOTHIC."

BIRMINGHAM:
1, OOZELLS STREET.
Telegraphic Address: "GOTHIC."

MANCHESTER:
37, BLACKFRIARS STREET.
Telegraphic Address: "GOTHIC."

TELEGRAPHIC ADDRESS: "GAS, LEEDS."

CLAYTON, SON, & CO. LIMITED, LEEDS, MAKE

RETORT LIDS

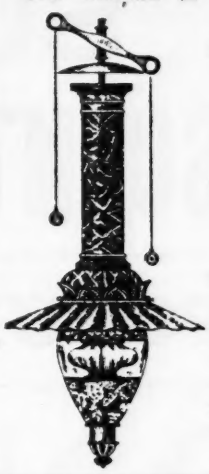
OF ALL FORMS AND SHAPES IN IRON OR STEEL

BY SPECIAL HYDRAULIC MACHINERY.

LONDON OFFICE: 60, QUEEN VICTORIA STREET, E.C.

PRICES ON APPLICATION.

The Climax of Regenerative Gas Lighting!!



THE

"VERTMARCHE"

A 280-Candle Power PLAIN IRON LAMP,

CLASS A— 55/-

LIGHT for LIGHT

less than half the price of any other Regenerative Lamp.

Manufactured in England.

HENRY GREENE & SONS,

153 & 155, CANNON STREET, LONDON BRIDGE, E.C.

PARTICULARS AND PRICES FREE. AGENTS WANTED.

G. & J. HAIGH,

Raven's Lodge Fire-Brick Works, DEWSBURY.

FIRE-BRICKS of the highest Quality, made from Fire-Clay of a most Superior and Refractory Character, suitable for GLASS-WORKS, GAS-WORKS, and BLAST-FURNACES.

WHITE GLAZED AND SALT GLAZED BRICKS, BUFF FACING BRICKS, &c.

For Prices and Analysis, apply as above.

BARRY, HENRY, & CO., LTD., ABERDEEN, SCOTLAND, and 64, Mark Lane, London, E.C.

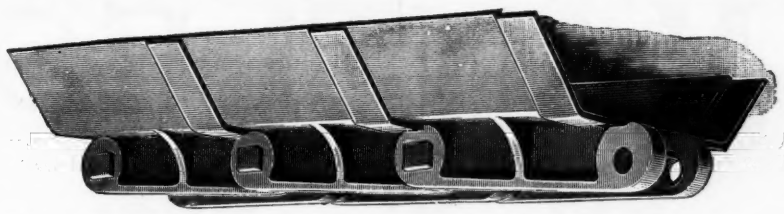
SOLE MAKERS OF HACK & PIGGOTT'S PATENT COKE-CONVEYING PANS AND LINKS COMBINED.

COKE-CONVEYORS.

Specialities:

TRANSMISSION OF POWER.

Rope and Belt Pulleys, Spur and Bevel Wheels, Shafting and Couplings, Pedestals, and Fixings.



Specialities:

TRANSMISSION OF MATERIALS.

Conveyors, Elevators, Grinding Machinery, Motors.

The only Coke-Conveyor which has proved a thorough success.

ALSO HACK AND GILE'S PATENT CONVEYOR PAN LINKS.

WRITE FOR PRICES AND PARTICULARS.

The fullest Inquiry invited. Can be seen at work in some of the principal Gas-Works in the United Kingdom, where they are giving the utmost satisfaction.

MOBBERLEY & PERRY STOURBRIDGE.

Manufacture & supply best quality of

Gas Retorts (SEGMENTAL, HORIZONTAL, or INCLINED.)

Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.

FIRE BRICKS, LUMPS, & TILES, BLUE STAFFORDSHIRE VITRIFIED BRICKS FOR PAVING, &c., &c.

EVERY REQUISITE FOR GAS-WORKS. Retort Setters sent to any part of the Kingdom.

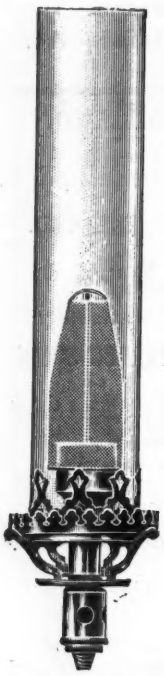
London Agents: Contractors for the erection of Retort-Benches complete.

BALE & HARDY, Gas Engineers and Contractors, BRIDGE HOUSE, 181, QUEEN VICTORIA STREET, E.C.

THE SUNLIGHT INCANDESCENT GAS-BURNER.

NEW POPULAR PRICES.

BURNERS



COMPLETE FROM

3/10 each.

WITH BYE-PASS, 5/-.

MANTLES

per 9/- doz.

INCANDESCENT

STREET-LAMPS

HIGH ILLUMINATING POWER WITHOUT CHIMNEYS

(SHELDRAKE'S PATENT)

WILL SHORTLY BE READY.

Price Lists, &c., on application.

The NEW INCANDESCENT (SUNLIGHT PATENT) GAS LIGHTING CO., LIMITED,

33 & 34, SHOE LANE, LONDON.

PENNY-IN-THE-SLOT GAS-METERS,
SHILLING-IN-THE-SLOT METERS.
Every Description of ORDINARY GAS-METERS.

THE AUTOMATIC
GAS-METER (1895) CORPORATION, LTD.

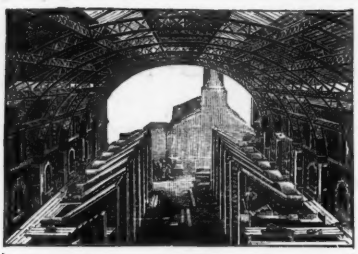
ROCK METER WORKS,
TORTWORTH STREET, STRANGEWAYS, **MANCHESTER.**
London Address: 59, QUEEN VICTORIA STREET, E.C.

NEW TO THE WORLD.
Revolution in Gas Heating!
THE ODOURLESS GAS-STOVE
("OMEGA" PATENT)
Perfect Combustion, pure Moist Air, no Smell, no Flue, no Water.
Polished Copper, 70s. Cost of Gas ¼d. per hour. Height 24-in.
Send for full Particulars to—
D. HULETT & CO., LIMITED,
55, HIGH HOLBORN, W.C.
Wholesale Agents for Middlesex, Surrey, Kent, and Sussex.

LONDON OFFICE
60, QUEEN VICTORIA ST. E.C.
TELEGRAPHIC ADDRESSES
"DRAKESON HALIFAX."
"ECLAIRAGE LONDON."
TELEPHONE No. 43.
"HALIFAX EXCHANGE"
GAS ENGINEERS.
CONTRACTORS.
IRONFOUNDERS.
RETORT SETTERS.
FURNACE BUILDERS.
ETC. ETC.
JONAS DRAKE & SON
SOLE AGENTS FOR
HISLOP'S
PATENT REGENERATIVE FURNACES
FOR
ENGLAND, WALES & ABROAD.
RETORT BENCHES ERECTED COMPLETE
WITH OR WITHOUT SPECIAL FURNACES.
RESULTS GUARANTEED.
OVENDEN HALIFAX
Designs and Estimates on Application.
GASEOUS FIRING A SPECIALTY.

W. C. HOLMES & CO.

IRONFOUNDERS AND CONTRACTORS.

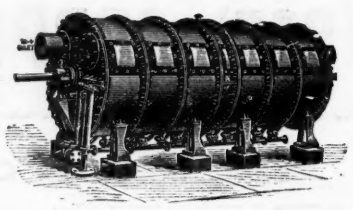


Makers of
GAS & CHEMICAL
PLANT.

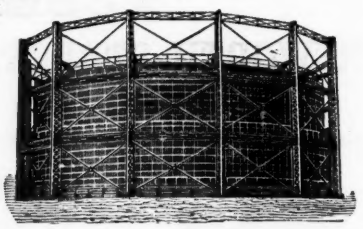
Telegrams:
"HOLMES, HUDDERSFIELD."

Improved
PATENT SCRUBBER-WASHERS,
All sizes,
From 50,000 to 5,000,000 Cubic Feet of Gas per day.
Results unrivalled. Send for Particulars and Prices.

MALLEABLE
and all Kinds of
CASTINGS.



GASHOLDERS of Improved Construction and of all Sizes.
ROOFS, BRIDGES, TANKS, GIRDERS.



Improved
BYE-PASS and
CENTRE-VALVES,
GOVERNORS,
and METERS.

Rotary or Pump
EXHAUSTERS.

80, CANNON STREET, LONDON,
AND
WHITESTONE IRON WORKS, HUDDERSFIELD.

THE "TRAFALGAR"
PREPAYMENT GAS-METER
FOR PENCE, SHILLINGS, OR ANY COINAGE.

THE ADVANTAGES OF THIS SYSTEM ARE:

1. Simplicity of Mechanism.
2. Absolute Accuracy.
3. Impossibility of being tampered with.
4. Unaffected by irregularities in shape or thickness of the penny.
5. Can be fixed to any ordinary Wet or Dry Meter.
6. Extra large Money-Box.
7. Price Changer can be altered without otherwise disturbing the Meter.
8. Index showing number of pennies in the mechanism at any time.
9. Rejection of half-pennies certain.

GUARANTEED FOR FIVE YEARS.

FRANK WRIGHT'S PREPAYMENT GAS-METER CORPORATION, Limited,

Telegraphic Address:
"Gasometer, London."

Manufacturers of Wet and Dry Gas-Meters.
Offices and Works: 62, GLENGALL ROAD, S.E.

Telephone
No. 59 Peckham.

TELEGRAMS: "FIRECLAY," LEEDS.

TELEPHONE No. 612.

COAL and COKE
Breakers, Elevators,
AND
Conveyors.

RETORTS,
Bricks, Blocks, Tiles,
&c.

ENGINEERS IRONFOUNDERS
EVERY
DESCRIPTION OF
RETORT SETTINGS
AND
IRONWORK.
WE GUARANTEE
RESULTS.
CONTRACTORS MANUFACTURERS

BUILDINGS,
ROOFS.

RE-SETTING
RETORTS.

We desire to call attention to our SHALLOW REGENERATIVE SETTINGS, which are comparatively inexpensive to erect, and productive of excellent results. They are specially designed to suit those Retort Houses where for various reasons it is undesirable to excavate to any great depth.

We shall be pleased to furnish Designs and Estimates on application.

THE LEEDS FIRECLAY CO. LTD., ENGINEERING DEPARTMENT, WORTLEY, nr. LEEDS.

S. CUTLER AND SONS, MILLWALL, LONDON.

CARBURETTED WATER-GAS PLANT.

(CUTLER'S PATENTS)

ADOPTED AT HORNSEY, HASTINGS, SOUTHEND,

PLYMOUTH, BUENOS AYRES, SOUTHALL (BRENTFORD GAS COMPANY).

GASHOLDERS

OF EVERY SIZE AND DESCRIPTION.

CUTLER'S PATENT GUIDE-FRAMING FOR GASHOLDERS

HAS BEEN ADOPTED FOR MANY IMPORTANT HOLDERS.

IT IS STRONG AND CHEAP, AND REQUIRES NO PIERS FOR ITS SUPPORT.

HARPER & MOORES,
STOURBRIDGE.

MANUFACTURERS OF
BEST FIRE-BRICKS, GAS-RETORTS,
LUMPS, TILES, AND ALL ARTICLES IN FIRE-CLAY.
Proprietors of Best Glasshouse Pot, Crucible, and other Stourbridge Clays.
MANUFACTURERS OF GLASSHOUSE POTS AND CRUCIBLES OF EVERY KIND.
ESTABLISHED 1836.

OSLER,
BIRMINGHAM.

MANUFACTURERS
OF GASELIERS
IN GLASS AND METAL.

BEST & LLOYD
MAKERS OF THE **BIRMINGHAM.**

PATENT "SURPRISE" PENDANT,
WITH PATENT SHADE.

The ONLY GAS-PENDANT suitable for Domestic Lighting; a room 18 ft. by 14 ft. being beautifully illuminated with one Incandescent Burner.

Extract from the JOURNAL OF GAS LIGHTING, Jan. 8, 1895.
"IN CONJUNCTION WITH
THE INCANDESCENT GAS-LIGHT
it quite **supersedes** the familar three-light pendent. We are able to bear witness to the **convenience** of the New Pendant."

JOSEPH CLIFF & SONS,
INCORPORATED IN
THE LEEDS FIRE-CLAY COMPANY, Ltd.
WORTLEY, LEEDS.

LONDON OFFICES & DEPÔTS:
Baltic Wharf, Waterloo Bridge.
WHARVES NOS. 2 & 4, INSIDE G.N. GOODS YARD, KING'S CROSS, N.
LIVERPOOL:
16, Lightbody Street.
LEEDS:
Queen Street.

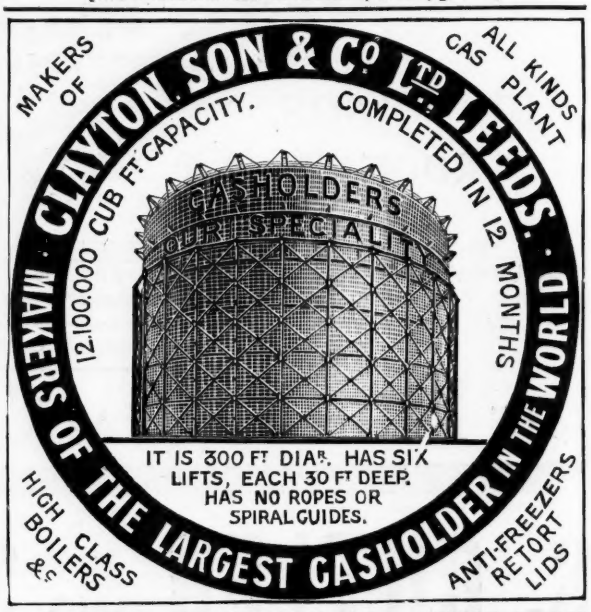
MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.
Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

ARROL-FOULIS
Patent Automatic Machinery
FOR
DRAWING AND CHARGING GAS-RETORTS.

Full Particulars may be obtained from the Sole Makers,
SIR WILLIAM ARROL & CO., Limited,
GLASGOW.
[See Illustrated Advertisement, Oct. 5, p. 766.]


MAKERS OF
CLAYTON, SON & Co LTD LEEDS.
ALL KINDS GAS PLANT
12,100,000 CUB FT CAPACITY.
COMPLETED IN 12 MONTHS
GASHOLDERS
SPECIALITY
IT IS 300 FT DIAR. HAS SIX LIFTS, EACH 30 FT DEEP. HAS NO ROPES OR SPIRAL GUIDES.
MAKERS OF THE LARGEST GASHOLDER IN THE WORLD
HIGH CLASS BOILERS &c
ANTI-FREEZERS RETORT LIDS

GIRDERS, ROOFS, & ALL KINDS OF STRUCTURAL IRONWORK.

London Office: 60, QUEEN VICTORIA STREET, E.C.
Telegraphic Addresses: "GAS, LEEDS," "ECLARAGE, LONDON.

PATENT TWISTED TAPER RYMERS & TAPS.

These **Patent Twisted Taper Rymers and Taps** are the best ever made for Gas and Water Service Connections. A true Hole and a correct Thread can be assured. They are easy to work, and will last much longer than straight grooved Taps and Rymers.

THOUSANDS ARE IN DAILY USE.

Also SCREWING-MACHINES, STOCKS and DIES (with Patent Twisted Dies), PIPE-TONGS, and other TOOLS.

Apply for Prices and Particulars to
JOHN RUSCOE,
ALBION WORKS, HYDE, near MANCHESTER.

OXIDE OF IRON.

NATURAL BOG ORE FROM OWN MINES.

Samples and Prices on application.

WM. H. MÜLLER & CO.,

81, PALMERSTON BUILDINGS, LONDON, E.C.

TRADE MARK: "Compascum." Telegraphic Address: "FERRUM."

THE THAMES BANK IRON CO.

UPPER GROUND STREET, LONDON, S.E.,

SUPPLY FROM STOCK

CAST-IRON RETORTS,

AND ALL KINDS OF GAS-WORKS APPARATUS.

SOCKET-PIPES FOR GAS OR WATER PURPOSES.

FLANGE PIPES FOR STEAM.

Sole Manufacturers of LYON'S "PATENT" GAS-MAIN SYPHONS.

AGENTS FOR

ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.

WILLIAM INGHAM & SONS,

Incorporated with the Leeds Fire-Clay Company, Ltd.,

WORTLEY FIRE-CLAY WORKS,
Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT

MACHINE-MADE GAS-RETORTS.

BOWENS' Ltd. Successors,

STOURBRIDGE.

MANUFACTURERS OF

BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.

Established 1860.

WILSON CARTER & PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

ADDRESS CHIEF OFFICES:

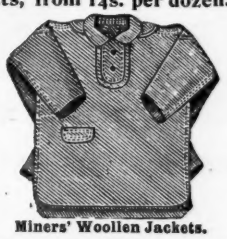
Temple Buildings, 50, New Street, Birmingham.

THOMAS BUGDEN,

Manufacturer of

Gas Bags for Mains, High Water-Boots, Miners' Woollen Jackets, Delivery and Suction Hose, Leather Machine Bands, Diving and Wading Dresses, Waterproof Coats and Capes of every description, Iron Wheels and Rollers covered with India-rubber, Rubber Bags for Testing Drains. Stokers' Mitts, from 14s. per dozen.

Gas-Bags for Mains.



Miners' Woollen Jackets.

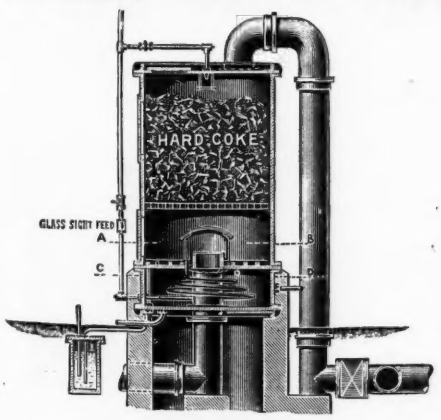
High Water-Boots.

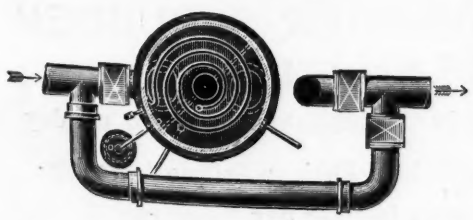
71, GOSWELL ROAD, LONDON, E.C.

R. & J. DEMPSTER, LTD., GAS PLANT WORKS,

Telegraphic Address: "SCRUBBER, MANCHESTER." National Telephone Nos. 54 and 2296.

NEWTON HEATH, **MANCHESTER.**





Sole Makers of

CRIPPS' PATENT

CARBURETTOR

FOR ENRICHING COAL GAS, AND FOR

DISSOLVING AND PREVENTING NAPHTHALENE DEPOSITS

IN GAS-MAINS.

PRICES ON APPLICATION.

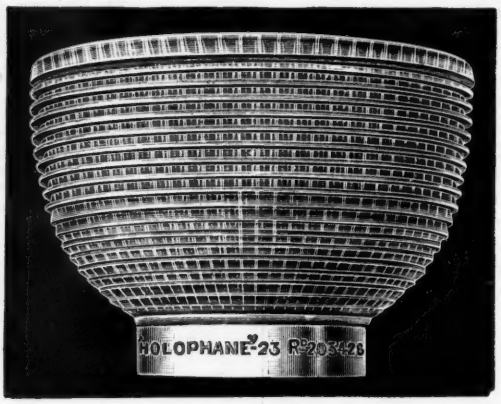
London Office: 181, Gresham House, Old Broad Street, E.C.

"HOLOPHANE"

PATENT LIGHT-DIFFUSING GLOBE.

Guaranteed to give more Light, with better Diffusion, than any Globe in existence.

LATEST PATTERN No. 23.



No. 23. NEW EYECUP for "C" Incandescent Burner.
Diameter 5 inches. Height 3½ inches.
IN CRYSTAL **24s.** PER DOZEN. IN NEW PATENT ROSE TINT **36s.** PER DOZEN.

SPECIAL PATTERNS FOR ARC, INCANDESCENT GAS "C" BURNERS, AND OIL-LAMPS.

Dr. DREHSCHMIDT, of Berlin, has recently made exhaustive tests with the latest "Holophane" Patent Light-Diffusing Globes, when used with Incandescent Gas-Burners, and has proved conclusively **that, below the horizontal, the "Holophane gives an average of 29 per cent. more light than the bare Incandescent Burner; and at angles below 45°**

OVER **100** PER CENT. MORE THAN THE BARE LIGHT.

PRICES FROM **2s.** *Illustrated Catalogue Free.*

"HOLOPHANE" LTD., 91, 93, 95, QUEEN VICTORIA STREET, LONDON, E.C.

CLAPHAM BROTHERS, LTD.,

— ESTABLISHED 1837 —

Wellington, Nelson, and Market Street Works,
KEIGHLEY, Yorks.

RETORT-FITTINGS,
CONDENSERS,
PURIFIERS, WITH PLANED JOINTS.

GASHOLDER TANKS,
COLUMNS, GIRDERS,
LAMP-POSTS,

And all Kinds of Gas-Making Apparatus and General Ironwork.

GAS and WATER VALVES and MAINS. ILLUSTRATED CATALOGUES ON APPLICATION.

ALSO SOLE MAKERS OF

Laycock & Claphams' Patent "ECLIPSE" WASHER-SCRUBBER,

FOR WHICH MANY REPEAT ORDERS HAVE BEEN RECEIVED.

Machines supplied and on order will deal with a total of 92,670,000 cubic feet of Gas per day.

The Sheffield United Gaslight Company have ordered their Fifth "Eclipse" Washer-Scrubber, which is to pass 5,000,000 cubic feet per day.

LONDON: Printed by WALTER KING (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, Oct. 12, 1897.